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TELEPHONE ENGINEER

AND MANAGEMENT

The National Telephone Magazine

MARCH 15, 1942 Text of Executive Order on War Control of Communication . . . Text of Conservation Order L-50 . . . Wire Chief's Course . . . Communications News . . . Personals . . . Quantitative Design . . . Line & Desk

LENZ
QUALITY
Excellent examples of the
CORDS
FOR DEFENSE
BUY
UNITED
STATES
SAVINGS
BONDS
AND STAMPS

DEPENDABLE PRODUCTS IN

LEICH'S COMPLETE LINE OF MATERIALS

For thirty-eight years, the Lenz organization has specialized in the manufacture of quality telephone and switchboard cords. This long association with operating companies has given Lenz a knowledge of telephone cord requirements which is probably unequalled anywhere. Today, telephone men specify "Lenz" on cord requisitions as if the name alone were a specification—and their confidence is fully justified. As with all Leich-Distributed products, the quality, value and assured satisfaction of Lenz Cords is beyond question.

LEICH SERVICE

Leich Sales Corporation

427 West Randolph Street, Chicago, Illinois

AT YOUR S

KELLOGG'S Nation-Wide Network

GREATER DISTRIBUTION FACILITIES

FULL AND COMPLETE STOCKS

SPEEDIER SHIPMENTS

FINEST QUALITY AT RIGHT PRICES

R SERVICE . . .

vor f Line Material Warehouses!

Your Guarantee of Dependable, Friendly, Experienced Service on All Supply Needs

As hundreds of experienced telephone men can testify, buying line materials from Kellogg is a mighty satisfying experience. The reason? Simply this, that we at Kellogg, out of deep appreciation for our customers and their needs, have put ourselves completely, wholeheartedly "at your service" in every way:

AT YOUR SERVICE with unsurpassed facilities for making prompt, dependable deliveries on all your line supply needs. From the Atlantic to the Pacific, from the Great Lakes to the Gulf, Kellogg maintains a system of over 50 well-stocked warehouses . . . with complete pole line hardware stocks at 15 points . . . with bare and insulated wire carried at 22 shipping centers . . . with poles stocked at 11 yards . . . with nearly a dozen other warehouses for anchors, pins and brackets, tools and cross-arms.

AT YOUR SERVICE with a complete line of materials to meet every need.

AT YOUR SERVICE with finest quality products, pre-selected for assurance of long, dependable service.

AT YOUR SERVICE with a staff of trained, experienced men whose cooperation you can rely on for intelligent, efficient handling of your orders.

AT YOUR SERVICE with the famous Kellogg "Double Guarantee," that stands behind every product we furnish.

Be sure to send your orders to Kellogg, where you'll get the speediest line supply service.

Everything for Line Repairs

Cable Materials

Drop Wire and Sub-station Protection

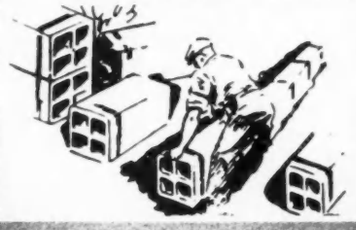
Every Kind of Linemen's Tools

Anticipate Spring Repair Needs Now

Spring is just around the corner. Get set now for essential construction and repair work. We urge you to check over your stocks of line materials and send in your order at the earliest possible date.

Poles and Pole Line Hardware

Conduit-All Types



AND EVERYTHING ELSE IN LINE MATERIALS

LINE SUPPLIES: Anchors, Bolts, Braces, Brackets, Cable, Clamps, Clips, Cross-arms, Guards, Grips, Insulators, First Aid and Tool Kits, Knobs, Ladders, Nails, Poles, Rings, etc., etc. . . . TOOLS of every needed type . . . WIRE for all telephone needs . . . All kinds of TELEPHONE PROTECTION EQUIPMENT.

KELLOGG SWITCHBOARD & SUPPLY CO., CHICAGO

EXTRA EDITION

Telephon

An Advertisement of Leading Supply Manufacturers Whose Products Are D

KELLOGG LINE SUPPLIES

Cramer Posture Chair Increases Efficiency Of All Operators

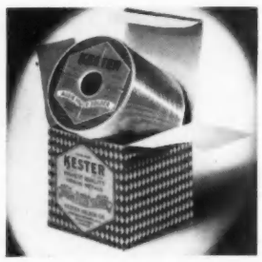
The scientific, adjustable posture support of these modern Cramer Posture Chairs makes operators more comfortable and efficient. 4 adjustments, easily made without tools, make Cramer Chairs adaptable and comfortable for everyone. The seat and back are padded with soft, resilient Whipped Foam Latex "Air Flow" cushions. Movement by the occupant makes air circulate throughout, keeping the seat and back always cool and comfortable. The seat and back covers are easily removed for cleaning or replacement. Write for circular which gives complete details.

ODD.....BUT TRUE !

A MINIATURE STORAGE BATTERY
THAT GIVES 1000 HOURS SERVICE!
A FLASHLIGHT BATTERY THAT CAN BE
RECHARGED BY THE USER...
FROM ANY CONVENIENT
ELECTRIC LIGHT SOCKET!
A 100 YEAR OLD
HEMINGRAY INSULATOR
COULD BE REMELTED AND MADE INTO
ANOTHER INSULATOR THAT WOULD
LAST ANOTHER 100 YEARS! BECAUSE TIME
DOES NOT AFFECT THE STRUCTURE OF THE GLASS
IDEAL
STORAGE
BATTERY
THE AVERAGE TELEPHONE POLE
WAS A TREE 60 YEARS OLD WHEN CUT!

HI-CONDUCTO BRONZE DROP WIRE FEATURES 85% CONDUCTIVITY

Millions of feet of Kellogg Bronze Drop Wire are now in service throughout the country—practical evidence of the unusual efficiency and long service life for which this drop wire has become famous. Look at these features: A special armored coat of Mica; a better method of tracer identification, banishing forever the old wear-inducing raised tracer; long life, moisture-proof insulation; a solid bronze conductor for 85% conductivity, 32 ohms resistance, high tensile strength and extreme ductility.

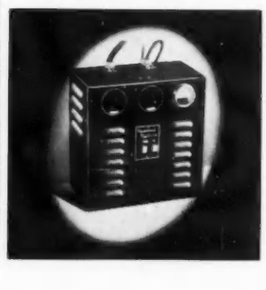


High Resistance Points Eliminated When Joints Are Protected with Kester Rosin-Core Solder

Solder-protected joints eliminate high resistance points and intermittent open and closed circuits. To save trouble, every joint should have this extra protection. For many years, Kester Rosin-Filled Solder has been known as the most satisfactory product of its kind. Nearly 1½ tons of this solder are used every year in the Kellogg factory alone! So to save your time and money, and improve transmission, insist that all joints be properly soldered with Kester Solder. Available on 1-, 5- and 20-pound spools.

Fansteel Balkite Taper Rectifiers Provide Automatic Charge Regulation

These dependable rectifiers provide automatic charge regulation for PBX, toll and small central office batteries at the lowest possible cost. Operation is extremely simple. After the charging rate is set to meet the average normal load requirements, the charge rises and falls in proportion to the load demand and variations in battery voltage. The charge automatically follows the load, rising with increased traffic and tapering off during light load periods. No overcharging, no undercharging. Write for Bulletin TC-51.



...one Facts

EXTRA EDITION

...Products | *Are Distributed by the Kellogg Switchboard and Supply Company*

...ES BRING SATISFACTION

Kellogg Koiled Kords Save Telephone Breakage

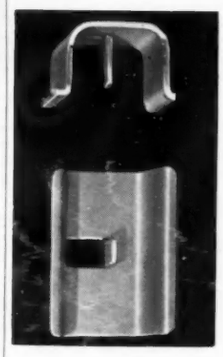
Kellogg Koiled Kords work as smooth as a coil spring and easily stretch out to 60 inches. Of great importance to you is the fact that these cords save telephone breakage because they are not apt to tangle with other objects or catch under desk or table corners. The action of Kellogg Koiled Kords is entirely secured by molding the outer rubber covering into the permanent coiled shape. This patented construction makes it the longest wearing cord of this type since no mechanical means is used to provide the retractable action.

HEMINGRAY INSULATORS HAVE LONG LIFE—SAVE ON OPERATING BUDGETS

When a glass insulator can be had that outlasts the pole it's used on, telephone men establish that insulator as their standard. So Hemingray through carefully controlled production which assures this extra long life, has earned its "first place" position. Made by Owens-Illinois Glass Co., these Hemingray Insulators are impervious to moisture—do not age or deteriorate—have high mechanical and sustained dielectric strength. They are unaffected by sudden temperature changes, and are available in all styles. Specify Hemingray Insulators and cut your operating budget.

MATTHEWS GUY WIRE CLIPS ARE EASY TO INSTALL—SAVE TIME

Thousands of Matthews Guy Wire Clips are now being used instead of the tedious old method of serving stranded guy wires above the clamp. They save guy strand and make a neater job in less time. The patented locking tongue is inserted between the wire forming the loop and the clip is clamped tight over the insulation with a pair of pliers or wire connectors. The tongue prevents the clip from slipping up or down. These handy clips are also excellent for holding the loops of secondary drops. 5 sizes to fit various size wire.



Automatic Door Switch Operates Ventilator and Light in Churchill Series 100 Booth

This famous booth made by the Churchill Cabinet Company makes an attractive and profitable unit wherever installed. It is soundly constructed, correctly designed and beautifully finished. The special acoustic design provides privacy and talking comfort to the user. The silent electric ventilator and the ceiling light are both operated by an automatic door switch. Choice of woods and finishes. Selected kiln dried lumber and skilled cabinet makers combine to make this booth a fine piece of furniture that will help to attract pay-station business.

Every Order Supervised By Men With Many Years of Telephone Experience

When telephone men have the assurance that their line supply orders are under the supervision of competent, experienced telephone men, they are saved a lot of work and worry, for they know that their orders will be filled right . . . the first time.

That's why so many phone men regularly send their orders to Kellogg. First of all they appreciate the help they get from the Kellogg representatives in selecting the proper materials. These men in the field for Kellogg are all thoroughly trained and long experienced. Their intimate knowledge of the operating man's problems makes their help invaluable.

Then, phone men realize that in Kellogg's line supply department they have their orders supervised by three men who have a combined total of 63 years' experience in the telephone business. That's right—Marty Bellion, Manager of the department has 25 years' experience, Charlie Reese has 21 years' and George Schedin has 17.

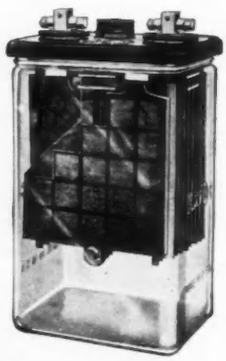
With men like these, veteran telephone men who know the business inside out, to check their orders, it's easy to see why thousands of phone men find it so satisfactory to use Kellogg's line supply service. For, when a rush order comes in, or when a telephone man has a tricky problem to be solved, he knows that he can depend on the experience and good judgment that will be used in helping him accomplish his job.

A MODERN MESSAGE TO GARCIA

TIME was when an army's communications depended on fleet-footed runners...brave men who faced danger, and carried messages through to vital points. It often took days.

All that is changed. Today, an army's signal corps uses radio, telephone, and even teletype to do the job faster.

Exide salutes the brave and progressive men of the U. S. Army Signal Corps. And Exide Telephone Batteries, whether emergency reserve, signalling, common battery, or P. B. X. stand by to help carry unlimited messages to Garcia.



Exide
TELEPHONE BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

Entered as Second Class Matter at the Post Office at Pontiac, Ill., under the Act of March 3, 1879.

HERE ARE THE ARCHITECT'S PLANS FOR OUR NEW EXCHANGE
"FINE – AND STROMBERG-CARLSON WILL ENGINEER A RELAYDIAL SWITCHBOARD FOR OUR EXACT REQUIREMENTS"

No. 500 RELAY

Mechanical parts have been reduced to a minimum, consisting of a one-piece frame and coil, a one-piece angle type armature, a self-contained coil, and a one-unit contact spring assembly.

No. 700 RELAY

This is a multiple contact relay with 36 "make" contacts arranged in 5 groups of spring combinations — each group a separate assembly. The armature is held securely in place on the frame by a T-shaped retainer adjusted to permit the armature to act freely.

THE DESIGN OF THE RELAYS ASSURES RELIABLE OPERATION

Stromberg-Carlson engineers are in a position to design RELAYDIAL switchboards for any exchange requirements. Reliability of operation distinguishes these RELAYDIAL switchboards.

Much of this is due to the construction of the No. 500 and No. 700 Type Relays which are used. One outstanding feature of this construction is the use of twin contacts of precious metal, designed to act independently of each other when the spring on which they are mounted is operated. If a dust particle prevents the closure of one contact, its twin remains effective.

All materials used in the coil assembly are entirely free from impurities that would cause damage to the copper wire used in the windings, even under extremely humid conditions. These materials were chosen to insure good insulation resistance and to maintain high operating efficiency.

Let Stromberg-Carlson engineers work out a RELAYDIAL installation for you.

STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY
Factory and General Offices: 100 Carlson Road, Rochester, New York, U. S. A.
Branch Offices: Chicago Kansas City San Francisco Toronto

Stromberg-Carlson

MAKERS OF VOICE TRANSMISSION AND VOICE RECEPTION APPARATUS FOR FORTY-SIX YEARS

TELEPHONE ENGINEER

MANAGEMENT · ENGINEERING · MAINTENANCE

"THE NATIONAL TELEPHONE MAGAZINE"
FOUNDED 1909

VOLUME 46—NO. 3
MARCH
1942

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Telephone Engineer Publishing Corporation

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THOUSANDS OF INSTALLATIONS

WAGNER ANCHORS

Thousands of installations from coast to coast prove the efficiency of Wagner Anchors.

Every part of these Anchors is made from malleable iron, which is recognized by engineers as the best-known material for use where strength, ductility, and rust-resisting qualities are concerned.

Every part used is produced in the manufacturer's own foundry, where tests are made of each heat, for tensile strength, elongation, and physical properties of the iron.

Produced in sizes from 55 to 210 sq. in. expanded area.

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Why We Recommend CHANCE CABLE RINGS

The Chance Cable Ring is so constructed that it will not slip or jump off the messenger when cable is pulled through, and it stays in position after installation has been completed. The spiral gripping hook provides a leverage action that makes installation easier. The special No-Tangle package makes these rings easy to handle and the method of packaging simplifies stocking. The curved bearing surface of Chance rings eliminates sheath cutting. For all these reasons we recommend Chance Cable Rings.

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ACROSS THE Editor's Desk

What with the L-50 Conservation Order, The Executive Order placing wire communications under control of the Defense Communication Board and an issue of TELEPHONE ENGINEER over 33% larger than last March, things have been in a hectic condition here at the office. The President's Executive Order caused us to hold up two days on our publishing date that you might have all of the latest news while it is news. We are indeed pleased over our growth in size as it enables us to bring you more information and articles that are of vital use during these war times. Highlights of the Communications News starting on page 21 is recommended for your immediate attention.

▼

A breath of Texas reached us last week in the way of a "left handed" pat on the back. W. D. Atkins of the Home Tel. & Elec. Co., Moran, Tex., writes complaining that his February 15 issue was still missing. He wrote: "I look forward to every edition of your magazine and I sure do miss it when I don't receive a copy." He is one of our best scholars in the Wire Chief's Training Course. Thank you, Mr. Atkins!

▼

When we asked for suggestions on articles to appear in our April 15 Spring Construction Number we expected many subjects to be mentioned. Maybe its a coincidence, or a "believe it or not" but the telephone industry upheld their record of getting-together and the contents will satisfy over 80% of those making suggestions. Educators tell us 60% is a fine average. Possibly we should make the "suggestion box" a monthly feature.

Ray.

MAKE "AR" REBUILDING PART OF YOUR MAINTENANCE PLAN!

For efficient operation under today's emergency conditions, make systematic rebuilding a regular part of your long-term maintenance planning. Don't wait until equipment falls to pieces or becomes unusable! Send in telephones, switchboards, P.B.X.'s, etc., for AR rebuilding and modernizing under a regular plan for increasing operating efficiency and lengthening useful life. Where we can, we'll lend you substitute equipment during the rebuilding period, if you so desire. Remember, AR rebuilding means a complete factory job by expert telephone craftsmen, and we rebuild, modernize or convert products to suit your needs. Write for prices and full information.

THE MARK OF QUALITY IN REBUILDING SERVICE

AUTOMATIC ELECTRIC

ORIGINATORS AND DEVELOPERS OF STROWGER STEP-BY-STEP MACHINE SWITCHING AUTOMATIC DIAL SYSTEMS

MAKERS OF TELEPHONE, SIGNALING AND COMMUNICATION APPARATUS
ELECTRICAL ENGINEERS, DESIGNERS AND CONSULTANTS

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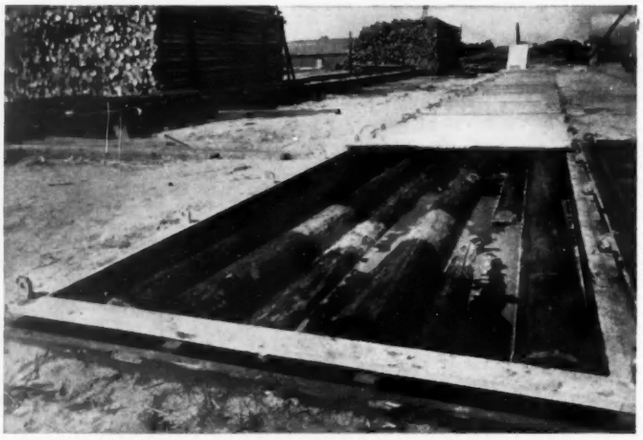
P&H PENTA POLES

OFFER LONG LIFE AT LOW COST

FULL-LENGTH TREATED NORTHERN WHITE CEDAR



Poles completely immersed in Preservative Solution

Interior view of Laboratory which controls all operations

YOU know the NATURAL advantages of P&H Northern White Cedar Telephone Poles . . . Standard of the telephone industry for 41 years.

NOW you can have them with a NEW, LOW COST yet amazingly EFFECTIVE protection against sapwood decay and termites . . . P&H "PENTA" POLES.

The poles are completely immersed from butt to roof in a solution of quick-penetrating solvent-carrier and a highly chlorinated phenol which is many times more toxic than any other pole preservative in common use. The solvent-carrier quickly evaporates, leaving a pre-determined amount of preservative permanently deposited in the cell structure of the sapwood. "Protect the sapwood and you insure the pole."

P&H "PENTA" POLES are clean, dry, odorless, pleasing in color, light in weight, easy to handle . . . ideal for quick, economical and ***permanent*** replacement of hazardous old poles.

ORDER NOW . . . for Prompt Shipment

Avoid the possibility of delays later, due to war transportation demands.

PAGE AND HILL CO.

MINNEAPOLIS, MINNESOTA • 50 CHURCH STREET, NEW YORK, N. Y.

Distributed by AMERICAN AUTOMATIC ELECTRIC SALES CO. • STROMBERG-CARLSON TELEPHONE MFG. CO.

"STILL IN THE LEAD"

TIME OUT. If the telephone served no other purpose than to provide busy housewives with pleasant respite from daily chores, that alone would be enough. These interludes make life more enjoyable. • To make sure that these calls—and all the others too—get uninterrupted service, select your cable with special care.

GENERAL CABLE

Paper Telephone Cables

DISTRIBUTED BY

AMERICAN AUTOMATIC ELECTRIC SALES COMPANY

1033 WEST VAN BUREN STREET • CHICAGO, ILLINOIS

BRANCH WAREHOUSES AT DALLAS, KANSAS CITY, LOS ANGELES, RICHMOND (VA.) AND SAN FRANCISCO

Telephone workers throughout the country are tied in with the war effort. The advertisement on the opposite page, appearing in March magazines, is a timely statement of the job they are doing.

AN ADVERTISEMENT OF THE BELL TELEPHONE SYSTEM

"We're backing them up"

Marching right along with the armed forces of this country are thousands of telephone workers.

They work side by side with the Army and Navy. Wherever the need is communications, you are likely to find telephone men and their trucks and materials.

Day and night the order is for speed and more speed.

They wear no uniforms, these telephone workers, but men in uniform know how much they are putting into the Nation's biggest job. They see it first-hand and they know it is first-rate.

BELL TELEPHONE SYSTEM

"THE TELEPHONE HOUR" IS BROADCAST EVERY MONDAY EVENING OVER THE N. B. C. RED NETWORK

LENZ OPERATOR'S CORDS

are preferred for their flexibility, longer wear and trouble-free service.

Keep 'em Talking with LENZ Cords

DISTRIBUTOR
H. H. VAN LUVEN
307 E. 3rd St., Los Angeles

DISTRIBUTOR
Leich Sales Corporation
427 W. Randolph St., Chicago

LENZ ELECTRIC MANUFACTURING COMPANY
1751 N. WESTERN AVE., CHICAGO, ILLINOIS, U. S. A.
"IN BUSINESS SINCE 1904"

It's What's Inside That Counts

ARMORED AGAINST THE ATTACKS OF

TERMITES

"Black Beauty" Poles are thoroughly treated with creosote to safeguard them from the assaults of termites and other wood-boring insects.

You can depend on

"BLACK BEAUTY" POLES
PRODUCT OF TEXAS CREOSOTING COMPANY

DISTRIBUTED BY
AMERICAN
AUTOMATIC ELECTRIC
SALES COMPANY
1033 WEST VAN BUREN STREET · CHICAGO, ILLINOIS
BRANCH WAREHOUSES AT DALLAS, KANSAS CITY, LOS ANGELES, RICHMOND (VA.) AND SAN FRANCISCO

25 YEARS AGO THIS MONTH

Taken from TELEPHONE ENGINEER files of February, 1917

IN a short paragraph which appeared in the March 1917, issue of TELEPHONE ENGINEER, the necessity of the telephone to "big business" was emphasized. The statement was made that "if the age of electricity should cease tomorrow, within twenty-four hours every one of our big trusts would begin to disintegrate." (We couldn't help wondering how this same circumstance might affect our present world with its multitudinous problems.)

TELEPHONE ENGINEER in March 1917, carried the story that the Mutual Telephone Company of Erie, Pennsylvania, would become a Class A company early in 1918. John Z. Miller, company manager at that time, authorized the announcement which was taken as an indication of the unusual growth of the company in the two years just past. The company was established in 1907.

The report of the equipment of the White Pass & Yukon Railroad telephone and telegraph lines with magneto and composite telephone apparatus appeared in the March 1917 issue of TELEPHONE ENGINEER. This road was built during the Klondike gold rush in 1898, was 110 miles long in 1917 (running from Skagway, Alaska, to White Pass, Yukon Territory, Canada) and carried all the traffic to Dawson and the upper Yukon beside many points further in the interior.

Following in the footsteps of the war department, the American Telegraph and Telephone Company, in March 1917, issued orders to allow no admittance to their various plants with the exception of those used for commercial purposes. This precautionary measure was put into operation also by the Associated Bell Companies.

The South Dakota Independent Telephone Association held a three days' session at Aberdeen in March 1917, and elected the following officers: President, J. A. Steninger of Parker; vice-president, H. P. Hartwell of Irene; secretary-treasurer, A. S. Hall of Redfield. The sessions were devoted to addresses by different telephone men on the problems of the telephone business, and by a school of instruction for operators.

ESSENTIAL POLE LINE HARDWARE COMES *FIRST*...

The battle against time to put power where it's most needed for war production calls for "weapons" as carefully chosen for their particular job as those for the fighting front.

Hubbard pole line hardware saves time for the lineman because of uniform dimensions, accurate threading and convenient design. Extra strength enables it to hold fast in the face of ice-loads, storms or other emergencies. The long-lasting galvanized finish reduces future maintenance.

Your linemen get a further reinforcement, too, when you order Hubbard pole line hardware . . . *via* GRAYBAR. For your local GRAYBAR Representative knows the conditions of service in your area. To the extent that today's conditions permit, he'll see that *all* your pole line needs are met with strong, soundly designed supplies, delivered with the least possible delay.

GraybaR . . . in over 80 principal cities

EXECUTIVE OFFICES: GRAYBAR BUILDING, NEW YORK, N. Y.

Remove the GUESS from the Time Taken for Toll Calls

The Calculagraph tells exactly when every call is started, figures the elapsed time to the second and prints the information clearly on toll tickets for a permanent record. The Calculagraph can't guess—can't make mistakes.

What's more, it saves busy operators the time and labor of figuring and eliminates possible errors.

The Calculagraph is made in three types. Electric Model No. 33 prints elapsed time to the second on standard toll tickets.

Electric Model No. 30 also prints elapsed time to the second and gives a choice of 12 to 24 hour time of day imprint.

Model No. 6 has an 8-day spring drive and prints elapsed time in minutes and quarter minutes with five-second indications. When AC current is not available or current is unreliable, this model is recommended.

Write for full particulars.

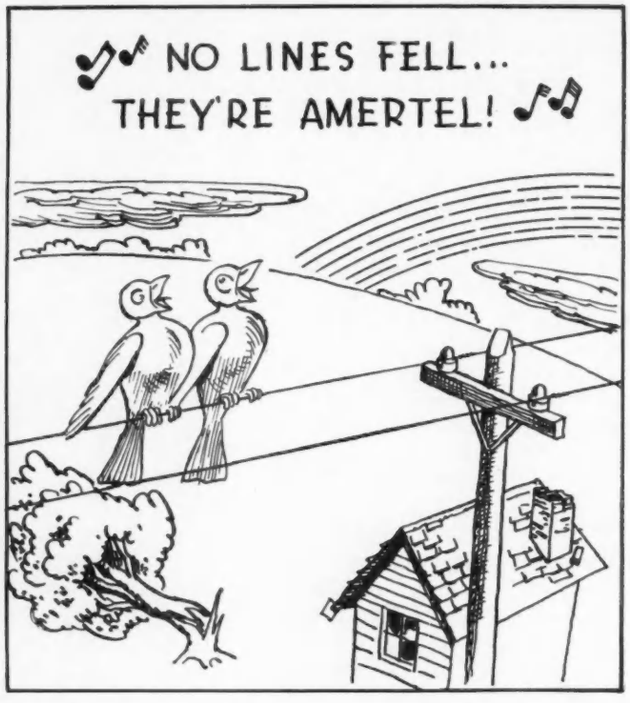
Model No. 33

CALCULAGRAPH CO.

308 SUSSEX STREET HARRISON, N. J.

CALCULAGRAPH

Accurate Toll Timing to the Second!



LINEMEN feel like singing, too, when they see how the extra strength of AMERTEL Wires helps to bring them through tough storms in tip-top shape. AMERTEL-85 and -135 are far stronger than the standard "BB" grade, and are equal or superior in telephonic transmission qualities. And this greater strength permits the use of longer spans, with resultant reduction in construction and maintenance costs.

AMERTEL Telephone Wires — including standard "BB", "EBB" and "Steel" grades—as well as AMERSTRAND Steel Strand, are made to a high standard of "Controlled Quality". Every step, from ore to the finished product, is under strict control and supervision. To add life to the wires, a coating of high-quality zinc is applied by the "hot dip" process. This forms a chemical bond between the zinc and the steel—providing a galvanizing finish that won't peel or flake.

Sold By Leading Distributors

LOOK FOR THESE TAGS.

They are placed for your protection on every coil of AMERTEL Telephone and Telegraph Wire and AMERSTRAND Steel Strand.

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

USS Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Export Company, New York

UNITED STATES STEEL

EDITORIAL

This Is War!

ON OTHER pages of this issue you will read of the new General Conservation Order L-50 made public by the War Production Board on March 3. We mention here that you can expect a much more drastic order in the near future. WE ARE AT WAR!

The order, while absolutely necessary in our National "All-out for Victory" plan, will undoubtedly work quite a hardship on manufacturers of telephone equipment and many operating companies of the industry. These companies will accept the order with their usual "anything to help attitude" and carry on as best they can.

While the manufacturers will be able to direct their entire facilities towards fulfilling army and navy communication needs, which is the most important thing at this time, they will have to hold in abeyance the wants of their customers in the industry who have helped them build their businesses . . . and to whom they will have to return for business when the battle is over and the American way of life again stands unchallenged.

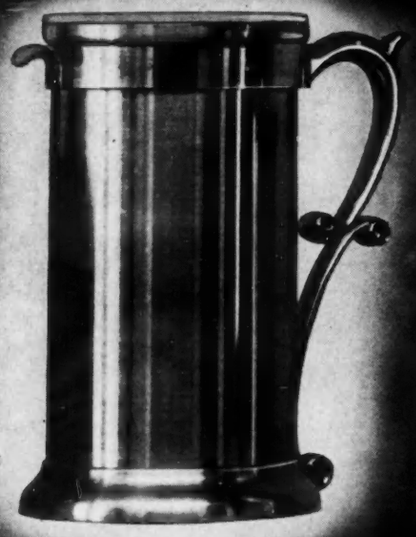
The operating companies are also going to have their share of troubles. In addition to not being able to secure certain sorely needed equipment, many of these companies are already operating short-handed or with new help due to their employees having joined the armed forces. These new men are going to need help . . . they are going to need the aid of experienced telephone men as well as advice from manufacturers.

THE manufacturers, with their skilled engineers, laboratories and experience gained through years of building and servicing telephone equipment plus the telephone trade journals with their staffs of special writers can now be of inestimable aid to these companies through the life of this Order L-50 and probably more stringent orders yet to come.

They not only can do it . . . they will do it!

Any one telephone station in the country can be a vital link in the winning of this war. Every station MUST be kept in working order. Every telephone man MUST lend every effort to his neighbor. Every manufacturer will willingly offer his *SERVICE*, not only to the operating companies using equipment purchased from him but will lend his aid to any and all companies coming to him for service. Manufacturers will of course seize every opportunity to impress on the industry, their willingness and desire to serve during this emergency as such cooperation will prove of vital help in ultimate victory, which would be ample reward indeed . . . such a reward PLUS the memory of such services rendered in years to come will also make future sales jobs much easier.

STANDARDS TO GO BY



THIS GALLON MEASURE has a volume of exactly 231 cubic inches at 4° C. (39.2° F.) which is by law the value of one gallon everywhere in the United States. It serves as a "yardstick" for all other volumetric measures, from milk bottles to gasoline pumps. It sets the standard.

PHOTOGRAPH COURTESY NATIONAL BUREAU OF STANDARDS, WASHINGTON, D. C.

THIS BATTERY is accepted by thousands of experienced telephone men as a standard for telephone cells. The *original* telephone cell, it is famous for long life, sustained voltage, uniformity of service. Developed by the world's largest dry battery laboratory, "Eveready" "Columbia" "Gray Label" Long Life telephone cells are used by more independent telephone companies than any other brand. It pays to specify them.

NATIONAL CARBON COMPANY, INC.

Unit of Union Carbide and Carbon Corporation

UCC

General Offices: New York, N. Y. • *Branches:* Chicago and San Francisco

The words "Eveready," "Columbia" and "Gray Label" are registered trade-marks of National Carbon Company, Inc.

LET'S GO! U.S.A. KEEP 'EM FLYING

GO BY STANDARDS

Highlights of the Communications News

Important Communications developments of the past month, briefed for busy readers

by

ROLAND C. DAVIES
Editor, Telecommunications Reports

THE three months' period of United States at war so far has brought no sweeping changes in the day-by-day operations of the telephone industry, but the groundwork is being laid in Washington for some steps of great significance in the future. Foremost is the ever-increasing shortage of vital war metals and materials which will lead to drastic curtailments of telephone service for the civilian population, not connected with the defense activities. Second, the telephone industry is going to bear the heaviest tax burden in its history, coupled with rising wages and costs of materials. As another situation calling for the greatest care and foresight in management planning will be the increased cooperation between the industry and the Army and Navy and the many war production manufacturing plants in the furnishing of the best possible service with a minimum of needed materials and facilities.

Government Control

WHILE it is by no means as of the present time as stringent as the Government's control in the first world war—and may not ever become as comprehensive—, the new War Emergency powers, enacted by Congress last January 26 as an amendment of Section 606 of the Communications Act, have now been made effective by an Executive Order of President Roosevelt conferring upon the Defense Communications Board the authority to use, control and close down telephone and telegraph wire facilities. In the issuance of this Executive Order, it was most significant and encouraging for the telephone industry that the DCB leadership emphasized these new powers over wire facilities did not mean any plan to be exercised at this time different from the past. But the DCB authorities stated emphatically the Executive Order gave the board the necessary power to act promptly if conditions in a particular area **from the standpoint of military requirements** should necessitate some additional controls over wire facilities.

Curtailment Order

TELEPHONE companies received their first curtailment order from the War Production Board during early March, but the WPB officials stressed that it was only a beginning of restrictions of service, particularly for civilians. In fact the first Conservation Order meant little to the telephone industry as a whole because the restrictions as to engineering practices and plant construction and betterment, promulgated by the WPB, are actually and have been for some time in effect throughout the industry. Due to the growing shortage of metals, especially copper, (and at one time there was a threat that copper might not even be available for maintenance and repair), the telephone industry under a new curtailment order, now being formulated, will probably be prohibited from any further installations of civilian telephones, unless local conditions do not warrant such a restriction, and each new toll construction project will be weighed on the basis of its relationship to Army, Navy or war production activities. However, the telephone industry with its vital essential place in the war effort and the national life is to be given special consideration with effective priority status in the securing of materials necessary to repair and maintain its facilities.

Metal Requirements

THE telephone industry is highly fortunate in the government agency which has been established to handle its requirements of metals and materials—the Communications Branch of the War Production Board which is headed by Leighton H. Peebles who has a thorough knowledge of its problems because of his previous engineering career and experience as NRA administrator for the industry. Mr. Peebles is an excellent executive—one of the best in the government service—and is exercising his duties with great care and thoroughness. He also has secured as his staff to work on telephone industry matters men who are "telephone men" such as Bruce H. McCurdy, former International Telephone and Telegraph Corp. operating executive and two leading Independent telephone executives as special consultants, Carl D. Brorein, former USITA president and Peninsular Telephone Co. (Florida) president and Richard A. Lumpkin, president of the Illinois Consolidated Telephone Co. With such a staff the industry is having its problems surveyed from a practical standpoint with every consideration given to the maintenance of the best possible service. (Details of the Conservation Order and a forecast of the proposed curtailment program follow at a later place in this column.)

Taxes

The new tax program which has just been presented to Congress by the Treasury Department contains three proposals of major interests to the telephone industry—the drastically increased corporation income surtax rates, the almost doubled excise levies on local and toll telephone service and a plan to tax telephone company pension trusts. However, the program of Secretary of the Treasury Morganthau faces somewhat of a rocky road through Congress and may be considerably revised before it is finally enacted by the Senate and House—in fact, it now appears doubtful if Congress will complete the tax bill until July or August. In the case of the increased excise taxes on telephone service, even though paid by the user, the telephone companies have to bear a substantial cost in their collection and accounting and there is one possibility that the companies may have to pay themselves the excise of 10% placed on coin-operated telephone stations for calls of less than 25c. Although the higher excise levy on local telephone service which would be raised from 6% to 10% under the Treasury program may have the impact of curtailing the number of telephone subscribers, this situation might prove desirable during the war period because of the shortages of facilities and materials. (Analysis of new tax proposals carried on another page in this issue.)

Construction

THE new four billion dollar program of construction of new Army camps soon

will get under way in full force. Up to the present the construction in recent months has been mainly expansions of existing Army camps, but the sites for the new establishments have now been selected in many places. This will mean that the telephone companies will be again called upon for substantial construction of new wire plant and switchboard and station installations in many parts of the country. Another important step is the Army plan to have the telephone companies operate and maintain the telephone systems in the camps themselves, freeing the Army personnel of this function, and this program has been instituted in several places.

Problems

THERE are a number of other problems in Washington affecting the telephone industry. Even though the nation is engaged in the greatest war of its history, the FCC still is continuing to operate its regulatory grist mill and during March engaged in an inquiry into the construction of carrier systems on toll lines, while on April 1 it will launch an investigation into the special service charges for telephone usage imposed by hotels, apartment houses and clubs. Another problem is the drastic rationing of tires and trucks and automobiles which has affected telephone companies, particularly the smaller Independents, in their repair activities. In the latter case the Independent industry is endeavoring to seek a solution in tire supplies for the small companies which do not use trucks for repair work but have passenger cars equipped for that operation.

Conservation Order

TO fit its operations into the war conditions of the ever-increasing tightening of vital and materials supplies, the telephone industry finds its toughest assignments in the months ahead and is faced with the distinct possibility of remolding its engineering practices and services to meet this situation. Certain drastic curtailments of telephone services for civilian users are in the offing—in sections of the nation where the war establishments of huge Army camps and defense manufacturing plants have been and will be mushroomed in size such stringent restrictions may come soon.

The first Telephone Conservation Order of the war was issued March 3 by the War Production Board, but its provisions were mainly the limitation of engineering practices in regard to future construction and plans for the betterment and relocations of plant facilities which are already being utilized and in operation by the preponderance of the telephone industry. The Bell System and most of the Independent telephone industry with the typical farsightedness which characterizes the planning of telephone company managements had foreseen the shortages of vital metals and materials and during the latter part of 1940 had instituted practically the entire program of conservation and restriction in cooperation with the Communications Branch of the WPB.

Convention Dates

Texas Telephone Association, Hotel Adolphus, Dallas, March 18 and 19.

Kansas Telephone Association, Hotel Jayhawk, Topeka, April 2 and 3.

Iowa Independent Telephone Association, Hotel Ft. Des Moines, Des Moines, April 7, 8 and 9.

Nebraska Telephone Association, Hotel Paxton, Omaha, April 14 and 15.

Ohio Independent Telephone Association, Deshler-Wallick Hotel, Columbus, April 21 and 22.

U.S.I.T.A. Executive's Spring Conference, Stevens Hotel, Chicago, April 28 and 29.

Indiana Telephone Association, Claypoole Hotel, Indianapolis, May 6 and 7.

Illinois Telephone Association, Pere Marquette Hotel, Peoria, May 12 and 13.

Pennsylvania Independent Telephone Association, Sterling Hotel, Wilkes-Barre, May 21, 22 and 23.

New York State Telephone Association, Hotel Syracuse, Syracuse, May 25, 26, 27.

Wisconsin State Telephone Association, June 3 and 4 (Place to be announced later).

Missouri Telephone Assoc., Muehlebach Hotel, Kansas City, Nov. 16, 17 and 18.

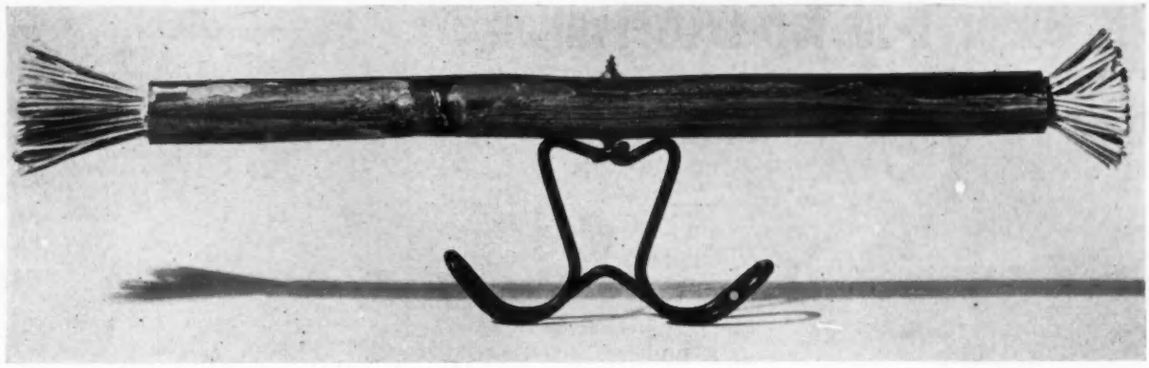
Another Curtailment Order?

This Conservation Order, however, is only "THE FIRST BITE", it was stressed to TELEPHONE ENGINEER by most authoritative WPB sources. The Communications Branch of the WPB, headed by Leighton H. Peebles, with its most efficient telephone section staff is now engaged in formulating a much more drastic and stringent telephone service **curtailment order** which will mean the possible rationing of telephone facilities for civilian users not connected with the war effort. This new Curtailment Order, which is scheduled to be issued during the latter part of March or early April, will establish categories or classes of telephone service in relation to their importance for the War effort so that the higher priority ratings for the stragetic metals and materials will be assigned to telephone service construction projects on the basis of their defense importance. Army and Navy telephone needs and war production manufacturing plants will be in the highest place and civilian defense and other activities related to the war effort will have the next order or requirements, while purely civilian service aspects will occupy the bottom position.

Effect

THE essence of the new Curtailment Order will be that vital metals must be conserved to the utmost—the minimum copper needs of the telephone industry, for example, during February were cut about in half by the WPB leadership from the estimates for the "red metal" requirements projected in January. Two major formulae, so far proposed in the new Curtailment Order, will be—for long distance toll service each new construction project will be weighed strictly on its merits of importance to the war effort and for local exchange service NO new extensions of facilities for civilians, not connected with the defense activities, is being contemplated. In fact, in communities where facilities are overloaded, there is a possibility that telephones in residences of civilians, not linked with the war effort, may have to be rationed and even taken out to be given to vital defense activities.

This new Curtailment Order, however, is being projected for effectiveness and use by the WPB in the role of an **as, if and when** restrictive mandate to be utilized only where absolutely needed. It can be compared with the Power Rationing Order, recently issued by the WPB for Buffalo and Upstate New York in the neighborhood of Niagara Falls, which contains drastic rationing to be put into effect whenever power supplies become definitely restricted. So the telephone industry can think in terms of this projected order as a future medium of conservation of its facilities and thus each **telephone company management** when this order is issued can plan in advance on where its provisions in its territory so as to be ready to put it into effect.



Many a coat swung from this coat hanger before it was discovered to be attached to a telephone cable. The screw of the metal hanger carefully avoided circuits in use in the 50-pair, 22-gauge house cable in a Jersey City location, and trouble did not become evident until a spare pair was tested for use in air-raid warning service recently. The cable, unfortunately, appeared to be a piece of moulding, and was painted the same color as the surrounding woodwork. L. M. Moglia, Splicer, Jersey City district, discovered the improvised hanger. (Courtesy of the New Jersey BELL.)

Priority

ANOTHER important step for the industry, now in the process of preparation by the WPB Communications Branch, is a separate Maintenance and Repair Order under which the industry will receive a high priority rating for its maintenance and repair requirements. This will remove the telephone industry from the P-100 Order under which all businesses and industries received their priority ratings for repair and maintenance. Another order, also in the making, is one to provide high priority status for new essential construction of telephone facilities which might be needed for Army and Navy and war manufacturing activities.

WPB Statement

IN issuing the Telephone Conservation Order L-50, the War Production Board made the following statement:

"The War Production Board has acted to save substantial amounts of critical materials by drastically limiting the future engineering practices of telephone companies and their plans for betterment and relocation of plant facilities.

"General Conservation Order L-50 also curtails installations of luxury types of telephones in business offices and households throughout the country. It requires telephone companies to refrain from future conversion of manual offices to dial offices and replacement of manual private branch exchanges by dial exchanges, and installation of extension telephones in private homes, unless they are essential for public health and safety.

"The program, based upon recommendations recently made by the Defense Communications Board, is designed **to save annually approximately 35,000 tons of lead, 29,000 tons of iron and steel, 29,500 tons of copper, 650 tons of zinc, 540 tons of crude rubber, and large amounts of other scarce materials vitally needed in the war effort.**

"Under the terms of the order, which does not apply to telephone installations for the official use of the armed services, except installation of hand sets to replace wall and desk types, companies estimating material requirements for installations of new facilities or equipment or expansion of existing facilities are required to limit their margins for expected growth of service requirements to a maximum of three years. This is designed to prevent use of materials for long-range estimates of future requirements and constitutes a drastic change in present engineering practices. Telephone companies, for most plant items, normally anticipate service requirements for a period of from 8 to 10 years.

"In addition to growth margin limitations, the order requires all telephone companies, unless otherwise authorized by WPB, to:

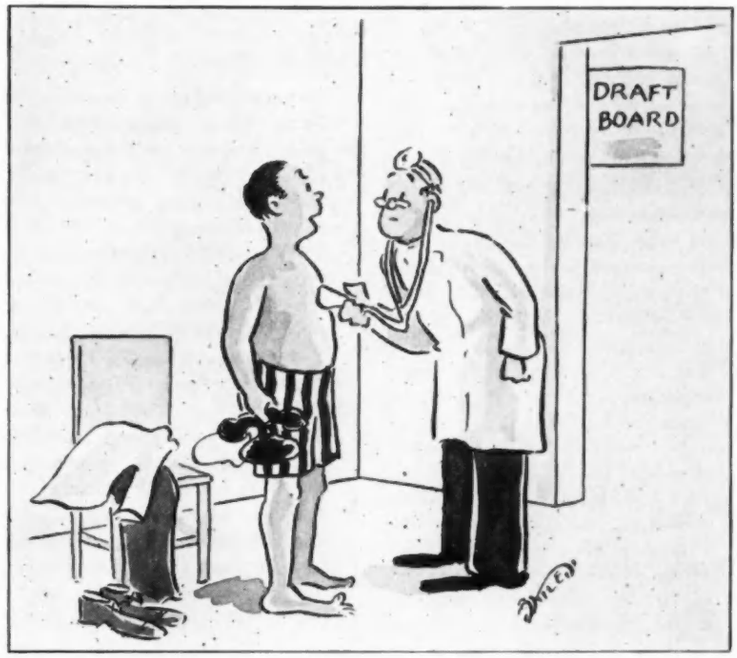
"(1) Discontinue the conversion of manual offices to dial offices, or the conversion of one type of manual office to another type.

"(2) Discontinue the replacement of manual private branch exchanges by dial exchanges.

"(3) Discontinue the replacement of exisiting wall and desk types of subscribers' instruments with hand sets, except in any instance where any such subscriber's instrument is beyond repair.

"(4) Discontinue the installation of extension telephones in residences except when such extensions are necessary

(Please turn to page 46)



"Are you sure this is necessary? I came to install the telephone!"

WPB Order L-50 for Conservation of Telephone Facilities

THE text of the WPB order for the conservation of scarce and critical materials by the wire telephone industry was as follows:

TITLE 32—NATIONAL DEFENSE
CHAPTER IX—WAR PRODUCTION BOARD

Subchapter B—Division of Industry Operations Part 1095—Communications General Conservation Order L-50—To Limit the Use of Scarce and Critical Materials by the Wire Telephone Industry.

Whereas the requirements of war have created a shortage of copper, brass, aluminum, nickel, and other materials used by persons engaged in wire telephone service; action has already been taken to conserve the supply and direct the distribution of such materials to insure deliveries for war and essential civilian requirements; the measures hereinafter set forth have been recommended by the Defense Communications Board; and it is necessary, in the public interest and to promote the defense of the United States to take such measures;

Now, therefore, it is hereby ordered that:

1095.1 General Conservation Order No. L-50.

(a) **Definitions.** For the purposes of this order: "Telephone Company" means any individual partnership, association, business trust, corporation, governmental corporation or agency, receiver, or any organized group of persons, whether incorporated or not, engaged in wire telephone service in the United States, its territories or possessions.

(b) Limitations on Changes in Equipment and Facilities. Unless expressly authorized by the Director of Industry Operations, all Telephone Companies shall:

(1) In submitting to the War Protion Board, directly or indirectly, applications for material requirements for installations of new facilities or equipment or expansion of existing facilities or equipment, limit the margins for expected growth of service requirements to a maximum of three years, but not to exceed one-half the period for which provision normally is made; provided however that this requirement shall not require the limitation of the margin of growth to a period less than one year, and provided further that conductors in cables designed or suitable for use in carrier current systems may be provided (but not equipped) in such numbers that when fully utilized by present or immediately contemplated carrier current system technique they will provide for a margin of expected growth of one-half the normal provision for such growth, even though such provision exceeds a three-year period.

(2) Discontinue the conversion of manual offices to dial offices, or the conversion of one type of manual office to another type.

(3) Discontinue the replacement of manual private branch exchanges by dial exchanges.

(4) Discontinue the replacement of existing wall and desk types of subscribers' instruments with hand sets, except in any instance where any such subscriber's instrument is beyond repair.

(5) Discontinue the installation of extension telephones in residences except when such extensions are necessary for the use of those who are charged with responsibilities for the public health, welfare or security.

(6) Employ party-line service in those instances where party-line installation will conserve scarce and critical materials.

(7) Discontinue replacements or additions to existing plant for the betterment or relocation of such plant, except to replacements essential to the maintenance or protection of service.

(8) Conserve or re-use existing telephone equipment and facilities, whenever such conservation or reuse will reduce the use of scarce and critical materials.

(c) **Non-Applicability to Changes Under Construction.** The terms of paragraph (b), hereof shall not apply to changes in equipment or facilities actually in the course of physical installation.

(d) **Exemption of Armed Services.** The provision of paragraph (b), except (b) (4), above shall not apply to installations for the official use of the armed services of the United States.

(e) Appeals. Any person affected by the Order who considers that compliance therewith would work an exceptional and unreasonable hardship upon him may appeal to the War Production Board, Washington, D. C., Ref: L-50, setting forth the pertinent facts and the reason he considers he is entitled to relief. The Director of Industry Operations may thereupon take such action as he deems appropriate.

(f) Effective Date. This Order shall take effect immediately and shall continue in effect until revoked by the Director of Industry Operations. (P.D.Reg.1, amended Dec. 23, 1941, 6 F. R. 6680; W.P.B. Reg. 1, Jan. 26, 1942, 7 F. R. 561, E.O. 9024, Jan. 16, 1942, 7 F. R. 329; E.O. 9040, Jan. 24, 1942, 7 F.R. 527; sec. 2 (a), Pub. No. 671, 76th Cong. 3rd Sess., as amended by Pub. No. 89, 77th Cong. 1st Sess.)

Issued this 2nd day of March 1942,
J. S. Knowlson, Director of Industry Operations.

Good Reading Says H. M. Stewart

In the February issue of the Pennsylvania Independent Telephone Association General Letter edited by H. M. Stewart, executive secretary, the following statement was carried:

We heartily recommend to you the article, appearing in the January 15, 1942, copy of TELEPHONE ENGINEER, by Mr. E. C. Blomeyer under the caption "Operating and Manufacturing Collaboration Will Help Now." This strikes us as an intelligent and practical study of our most acute and serious problem, and that an unqualified adoption of Mr. Blomeyer's suggestions will prove quite helpful in keeping our business afloat during the storm now raging.

We thank you, Milt, and endorse your suggestion.

Tires

A new regulation was issued February 19 which provides that passenger automobiles of telephone companies which are used for maintenance and repair work may have their tires recapped or retreaded. If needed, secure a permit from your local tire rationing board.

Fig. 1—Ploughing in the Transcontinental Toll Cable Somewhere in Nebraska.

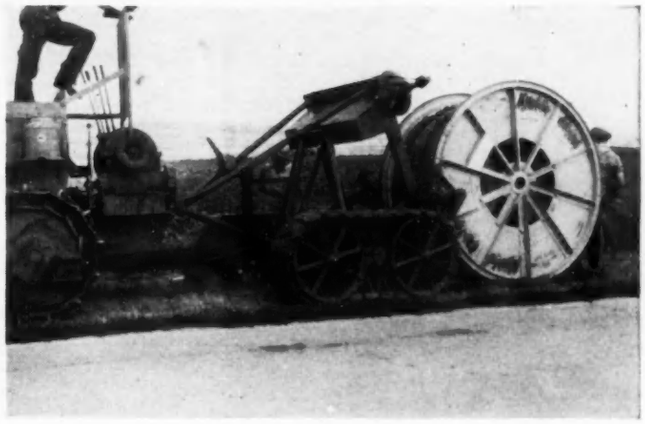


Fig. 2—Preparing to Load Full Reel of Cable on Special Cable Pick Up Reel.

Wire Chief's TRAINING COURSE

SECTION XI

Cable Construction—Part I

(Prepared Expressly for TELEPHONE ENGINEER by the Lincoln Engineering School)

General

CABLE is an expensive item of plant that should be carefully engineered, constructed, and maintained, if it is to give long life at a reasonable cost.

A higher degree of skill is required in the erection and splicing of cable than is true of open or drop wire.

The engineering of cable plant requires that consideration be given to existing and potential subscribers line requirements and that an efficient multiple be worked out for the various terminals so that a given size cable will offer maximum economy over a period of years in serving a given area.

Cable plant design is covered in a separate lesson so let us concern ourself here with the general features of cable construction.

Cable Data

THE telephone plant manager should be familiar with the general mechanical data on the common sizes of telephone cable.

The most commonly used cable for exchange purposes is No. 24 gauge and for toll purposes No. 19 gauge. The last few years has seen a trend toward the use of No. 26 gauge cable for exchange use and some use of loaded No. 22 gauge for toll and trunk purposes.

For the average small exchange either No. 24 or No. 26 gauge cable is satisfactory from a transmission standpoint and either one considerably cheaper than 22 gauge which was formerly the most common size cable used in Independent plants.

While some use has been made in the past of toll cables having conductors larger than 19 gauge (16 and 13 ga.) the present trend is to use 19 gauge and to reduce the loss to a satisfactory value by means of loading.

Types of Cable

TELEPHONE cable is available in three basic types, viz:

1. Regular paired cable.
2. Regular quadded cable.
3. Combination paired and quadded cable known as **composite cable.**

For ordinary exchange use where phantoms are not required, regular paired cable should be used. If a number of phantom circuits are worked through a cable, as for example a rural or toll line entrance cable and particularly where the cable is more than ¼th mile in length, quadded cable should

Table No. 1 — Data on 19 Gauge Telephone Cable

Capacity—Not more than .09 m.f. per mile.
Resistance—Not more than 92 ohms per cct. mile.
Insulation—(Paper-Ribbon Insulated)

Number of Pairs	Thickness Sheath Inches	Mean Outside Diameter Inches	Approximate Weight Pounds Per Foot	Convenient Number of Feet on Reels
6	.063	.42	.41	2800
11	.065	.52	.56	3000
16	.067	.60	.70	4000
26	.070	.72	.93	3000
51	.075	.95	1.46	2500
76	.080	1.14	1.99	2200
101	.084	1.29	2.46	1700
152	.090	1.56	3.38	1400
202	.095	1.78	4.27	1400
303	.104	2.15	5.97	900
404	.112	2.47	7.68	700
455	.115	2.61	8.48	650

be used if serious cross-talk is to be avoided.

If the cable carries in addition to the phantom circuits a number of exchange circuits requiring only pairs, then a composite cable may be justified, although if there is only a few pairs required and most of the circuits require quads, then it is usually cheaper to buy a cable consisting entirely of quads.

Kinds of Cable

LEAD covered telephone cable is available in several different kinds of sheath protection. The several kinds of cable are:

1. Paper insulated cable with a lead sheath (known as ordinary cable).
2. Paper insulated cable with a lead sheath protected from soil corrosion by a protective coating consisting of several wrappings of paper and jute which have been thoroughly impregnated with an asphaltic compound (known as Jute Protected cable).
3. Paper insulated cable with a protective coating consisting of a layer of paper and jute, a steel tape armor, and a top covering of asphalt flooded jute (known at Tape Armored cable).
4. Paper insulated cable with a protective coating consisting of paper and jute in combination with a steel wire covering which in turn is protected against corrosion by an asphaltic flooded jute. This type cable is available in two grades, one having a heavy armor wire and one a light armor wire. The cable is known respectively as **submarine** and **gulley** type.
5. Textile insulated lead covered able often referred to as building cable. This cable is available in two types known as **coded** and **uncoded.** The pairs in coded cable can be identified by their color coded coverings, i.e., blue, orange, green, etc., whereas the uncoded type uses plain textile insulation and the pairs must be identified by "buzzing out."

Similar cable but having an enamel coating under the textile is also available for use in locations where high humidity prevails.

Field of Use

ORDINARY lead covered paper insulated cable is used for both aerial and underground construction. It is not suitable for placing directly in the soil due to danger of sheath corrosions as the result of chemical action.

In some soils it may last for years while in others it will "pit through" in a relatively short time. Where it is desired to bury lead covered cable directly in the earth, an improved coating of asphalt and building paper should be applied to protect the sheath.

Lead covered paper insulated cable is also used to some extent as a distribution cable in buildings where there is a concentration of telephones requiring cable distribution. Textile insulated "tip cables" are required to terminate paper insulated cable in cross connecting and house terminals. The textile insulation is more rugged and will not absorb moisture as will paper. Where terminals are placed in dry locations (not in basements) it is feasible to terminate paper insulated cable directly on connecting blocks without the necessity of a textile insulated tip cable. However, this is not considered good practice altho it has proven both cheaper and apparently satisfactory.

Jute protected cable is a comparatively new item and is already finding extensive use in exchange distribution plant. Due to the protective coating it is comparatively free from soil corrosion or electrolysis difficulties and can be expected to have long life if buried directly in the soil. It finds its widest use in residential areas in which, due to civic pride or other reasons, an economical underground distribution plant is desired. It is particularly economical where the situation is such that cable can be ploughed into the coil, thus avoiding necessity for trenching and back-filling. It is usually buried from 20 to 30 inches in the ground. It is of course subjected to mechanical hazards such as workmen digging in the vicinity of the trenches with the possibility of cutting into the cable which having no mechanical protection would be likely to be put out of operation if struck by the workmen. In most cases the use of jute protected cable for exchange distribution plant will be

Table No. 2 — Data on 22 Gauge Telephone Cable

Capacity—Not more than .09 m.f. per mile.
Resistance—Not more than 184 ohms per cct. mile.
Insulation—(Paper-Pulp Insulated)

Number of Pairs	Thickness Sheath Inches	Mean Outside Diameter Inches	Approximate Weight Pounds Per Foot	Convenient Number of Feet on Reels
11	.063	.42	.40	3500
16	.064	.47	.48	3500
26	.066	.57	.63	4200
51	.070	.73	.95	3000
76	.073	.86	1.23	2400
101	.076	.98	1.51	3000
152	.080	1.16	2.01	1700
202	.084	1.32	2.51	1600
303	.091	1.59	3.45	1400
404	.095	1.78	4.27	1200
606	.104	2.15	5.97	900
909	.115	2.61	8.46	650

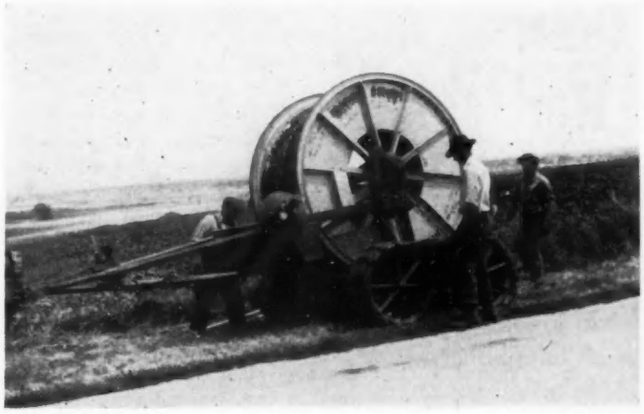


Fig. 3—Cable Reel Loaded and Ready to Transport to Cable Plow.

Fig. 4—Transferring Heavy Cable Reel to Trailer Attached to Plow.

found more costly than aerial distribution.

Jute cable is also useful for feeding toll or farm leads extending beyond the city limits and where long runs without the necessity for intermediate terminals are possible. It has the obvious advantage of negligible maintenance cost and freedom from storm damage.

Tape Armored cable of course has all the advantages of jute protected cable plus the added feature of protection against mechanical damage. Where toll or large size trunk or exchange cables are buried directly in the soil, it is generally advisable to use tape armored cable in preference to jute in order to get the added protection which the mechanical armor provides.

Submarine and Gulley cable with its added mechanical protection and greater strength does not find much application by the smaller companies and its use is confined mainly to the larger companies and then only for special situations which because of the nature of the service provided require added protection.

Miscellaneous Data on Cable

LEAD covered cable consists of approximately 99% lead and 1% antimony. The antimony increases the hardness of the lead sheath and gives a greater ability to withstand vibration and minimize ring cutting.

Telephone cable is manufactured by insulating the individual conductors by either a spiral wrapped paper ribbon or with a paper pulp. The individual insulated conductors are then twisted into pairs, the length of the twists being from 3 to 5 inches according to specifications. Paired conductors are then formed into cores of the necessary size of number of pairs. One or more "extra" pairs are usually included in a core in order to insure that should a fault oc-

(Please turn to page 50)

Table No. 3 — Data on 24 Gauge Telephone Cable

Capacity—Not more than .09 m.f. per mile.
Resistance—Not more than 290 ohms per cct. mile.
Insulation—(Paper Pulp Insulated)

Number of Pairs	Thickness Sheath Inches	Mean Outside Diameter Inches	Approximate Weight Pounds Per Foot	Convenient Number of Feet on Reels
11	.061	.36	.31	3300
16	.062	.39	.36	2900
26	.064	.47	.47	4500
51	.067	.60	.70	4200
76	.069	.70	.88	3000
101	.071	.78	1.06	3000
152	.075	.93	1.41	2800
202	.078	1.05	1.73	2200
303	.082	1.24	2.29	1600
404	.087	1.42	2.92	1400
606	.093	1.70	4.04	1100
909	.101	2.05	5.56	900
1212	.109	2.34	7.13	650

Table No. 4 — Data on 26 Gauge Telephone Cable

Capacity—Not more than .085 m.f. per mile.
Resistance—Not more than 460 ohms per cct. mile.
Insulation—(Paper Pulp Insulated)

Number of Pairs	Thickness Sheath Inches	Mean Outside Diameter Inches	Approximate Weight Pounds Per Foot	Convenient Number of Feet on Reels
11	.060	.32	.27	3500
16	.061	.36	.31	3300
26	.063	.42	.40	4000
51	.065	.52	.55	4200
76	.067	.60	.69	3700
101	.069	.69	.84	3500
152	.072	.80	1.08	2400
202	.074	.90	1.30	2500
303	.078	1.08	1.74	1600
404	.082	1.21	2.16	1600
606	.087	1.46	2.90	1400
909	.094	1.75	4.00	1100
1212	.100	2.00	5.11	900
1818	.110	2.41	7.09	650
2121	.115	2.61	8.15	650

Text of President's Executive Order Placing Wire Communications War Control Powers Under DCB

We are reproducing the text of the Executive Order of President Roosevelt dated March 6. It is of vital interest to all telephone companies. Because of the importance and far reaching effect we suggest your making this reproduction part of your permanent files.

Executive Order Prescribing Regulations Governing Use, Control, and Closing of Stations and Facilities for Wire Communications

WHEREAS section 606 (d) of the Communications Act of 1934 (48 Stat. 1104; U.S.C., title 47, sec. 606), as amended by the act of January 25, 1942, Public Law 413, 77th Congress, provides, in part as follows:

Upon proclamation by the President that there exists a state or threat of war involving the United States, the President, if he deems it necessary in the interest of the national security and defense, may, during the period ending not later than six months after the termination of such state or threat of war and not later than such earlier date as the Congress by concurrent resolution may designate * * * (2) cause the closing of any facility or station for wire communication and the removal therefrom of its apparatus and equipment, or (3) authorize the use or control of any such facility or station and its apparatus and equipment by any department of the Government under such regulations as he may prescribe, upon just compensation to the owners.

WHEREAS the United States is now at war with the Empire of Japan, Germany and Italy; and

WHEREAS it is necessary in the interest of the national security and defense, and for the successful prosecution of the war that the Government of the United States take over, use, and operate certain facilities for wire communication, or parts thereof, within the jurisdiction of the United States, and inspect, supervise, control, or close certain facilities for wire communication, or parts thereof, within the jurisdiction of the United States:

NOW THEREFORE, by virtue of the authority vested in me by the aforementioned section 606 (d), as amended, and as President of the United States, it is hereby ordered that from and after this date the Defense Communications Board (hereinafter referred to as the Board) created by Executive Order No. 8546[1] of September 24, 1940, shall exercise the power and authority vested in me by section 606 (d) of the said Communications Act of 1934, as amended, pursuant to and under the following regulations:

1. The Board shall determine and prepare plans for the allocation of such portions of governmental and non-governmental wire facilities as may be required to meet the needs of the armed forces, due consideration being given to the needs of other governmental agencies, of industry, and of other civilian activities.

2. The Board shall, if the national security and defense and the successful conduct of the war so demand, designate specific facilities for wire communication or portions thereof for the use, control, supervision, inspection or closure by the Department of War, Department of Navy or other agency of the United States Government.

3. The Board shall, if the national security and defense and the successful conduct of the war so demand, prescribe classes and types of facilities for wire communication or portions thereof which shall be subject to use, control, supervision, inspection or closure, in accordance with such prescription, by the Department of War, Department of Navy or other agency of the United States Government designated by the Board.

4. Every department and independent agency of the Government shall submit to the Defense Communications Board, at such time and in such manner as the Board may prescribe, full information with respect to all use made or proposed to be made of any facility for wire communication and of any supervision, control, inspection or closure which has been or is proposed to be effected pursuant to paragraph 3 hereof.

5. No facility for wire communication shall be taken over and operated in whole or in part or subjected to governmental supervision, control or closure unless such action is essential to national defense and security and the successful conduct of the war. So far as possible, action taken pursuant to this Order shall not interfere with the procurement needs of civilian governmental agencies, the normal functioning of industry or the maintenance of civilian morale.

6. Until and except so far as said Board shall otherwise provide, the owners, managers, boards of directors, receivers, officers and employees engaged in wire communication shall continue the operation thereof in the usual and ordinary course of business, in the names of their respective companies, associations, organizations, owners or managers, as the case may be.

7. The head of any department or agency which uses or controls any facility for wire communication pursuant to the terms of this Order shall ascertain the just compensation for the use or control of such facility and recommend such just compensation in each such case to the President for approval and action by him in accordance with the provisions of subsection (e) of Section 606, as amended, of the Communications Act of 1934.

8. By subsequent order of the Board, the use, control, or supervision of any facility for wire communication or class or type thereof assumed under the provisions of this Order may be relinquished in whole or in part to the owners thereof and any restrictions placed on any station or facility for wire communication pursuant hereto may be removed in whole or in part.

9. All terms herein used shall have the meanings ascribed to such terms in section 3, as amended, of the Communications Act of 1934.

10. All regulations of general applicability issued by the Secretary of War, the Secretary of the Navy, or any other governmental agency under these Presidential rgulations shall be published in the FEDERAL REGISTER.

FRANKLIN D. ROOSEVELT.

THE WHITE HOUSE
March 6, 1942.

QUANTITATIVE DESIGN OF CENTRAL OFFICE EQUIPMENT FOR SMALLER TELEPHONE OFFICES

(Continued)

By JAY G. MITCHELL

Controlling Factors in Design—Essential Traffic Data—Possibility of Error—Effect of Error—Practical Application of Design Method—Manual Office Design—Battery Size and Capacity—Floating Battery—Battery Drain—Day Traffic vs. Busy Hour Traffic—Effect of High-efficiency Equipment.

Controlling Factors

THE quantitative design of the Main Distributing Frame and any other distributing frame equipment that may be necessary for the proposed new Central Office is subject entirely to the number of circuits, ordinarily cable pairs, that are to be terminated. As has been pointed out this may include facilities for terminating cable pairs which are temporarily, pending cable rearrangements, represented in the new office.

From the distributing frames inward to the switching equipment itself every other element in the office is designed to meet demands fixed by the traffic load to be handled. This is true of the power-plant (storage battery, charging equipment and ringing equipment), the switching equipment (manual, high-efficiency manual, semi-mechanical or dial), the cabling and the floor plan. For this reason it is essential that the engineer working out the equipment design for the new office, except in case of the sharpest emergency, have complete traffic data. With such complete data it is possible for him to be certain that his final conclusions are not in error and that the completed installation will be adequate in facilities. The controlling items of such data, enumerated in an earlier installment of this series and here repeated are:

C. The total number of originating calls per day (in the form of peg counts for each peg count day for at least each of the latest twelve calender months).

D. The total number of originating calls during the busy hour (as disclosed by the peg counts for each peg count day for at least each of the latest twelve calender months).

E. The total number of incoming trunked calls classified as to method of operating (ring down, order wire, long distance, straightforward).

F. The total number of outgoing trunked calls classified as to method of operating (ring down, order wire, long distance, straightforward).

Note: Items C to F inclusive are preferably shown by hours of the day except that the period from 12 midnight to 6 A. M. is usually recorded on the peg count form in one space in the same way as each of the individual hours for the rest of the 24 are recorded.

No apology is offered for the repetition of these items. There are telephone offices which were equipped and placed in service without any such complete record of traffic data being available to the designing engineer. The working out of the specifications for the Central Office Equipment in such cases may be exactly correct. It can be incorrect, however, because without adequate study too little equipment and facilities will have been provided. When this has unfortunately occurred the service in the new office, often looked forward to with pleasure by subscribers, will surely be below par, and expensive and tedious changes may be necessary. It can be incorrect, also, because **too generous** provision in equipment and facilities has been made. When this is the case the Central Office Equipment investment is unjustifiably high and operating expense is inflated without any corresponding benefit to the telephone company nor to the service.

There are, of course, several short cuts used by experienced engineers involving the use of approximations based on past experience. The conservative course, however, is to insist upon complete traffic data, especially when the object desired is to make confidential comparative studies of several types of equipment. Except in the case of emergency, such as destruction of the central office by fire, the time required to compile the needed traffic data is not of serious importance. If at all possible the design of the Central Office Equipment, from the quantitative standpoint, should not be attempted without.

Practical Application

THE practical application of the data described in items C to F above can easily be worked out from the general outlines already given. It is believed, however, that the illustration by concrete example will be found helpful. Assume, therefore, that the proposed office is to serve 1,000 subscribers line circuits and 100 trunks and other circuits and that the observed traffic data for this office is as follows.

C. Originating calls per day 4,500

D. Originating calls busy hour 390

E. Incoming trunked calls busy hour 130

F. Outgoing trunked calls busy hour 300

In a Manual Office

THE total number of originating calls **per day** enables the engineer designing a common battery office to compute the capacity required in the power plant (storage battery and charging equipment). The total number of originating calls with the total number occurring during the **busy hour** enables the designing engineer to decide on the size of the battery cells that must be provided. This is because the storage battery must have not only sufficient ampere-hour capacity to provide for the traffic demands for the **day** but must also be of large enough discharge capacity to provide the energy required for the operation of the office during the **busy hour.** It is to be emphasized again that the traffic demands of the proposed new office should, except in the case of emergency such as a destructive fire, be computed from peg counts consisting of a record for each peg count day for the latest twelve calendar months. This is true because of the possibility that any **one peg count** record may easily fail to disclose the usual conditions in the office. Should it happen that the power plant, for instance, is conservatively sufficient to provide power for the traffic shown by one peg count, taken on a day when the traffic is abnormally low in volume, it might conceivably happen that it would not be of sufficient capacity to provide the power for a period of some other one day in which the traffic happened to be abnormally heavy although still within the reasonable limits of telephone usage for the community. When several peg counts are available, each one taken in a different month from all the others, there is very little likelyhood that the picture, as to reasonably to be expected conditions, will not be adequately presented. In the absence of such a set of traffic records it is necessary for the designing engineer to assure himself, by inquiry and observation, whether the available data should not be loaded with a factor of safety. It is the considered opinion of the author that on occasions when only one peg count record is available that at least 10% should be added to the traffic load for the day and for the busy hour before computing the battery capacity, in the interest of conservatism. For the benefit of the battery itself the capacity should not be too large. It would be too large if the normal drain caused the battery to discharge at a rate so much less than its normal discharge rate as to damage the plates.

Assuming that these safety requirements have been met in determining the traffic load figures given above and that the battery drain for the **equipment under consideration** is found by circuit analysis methods to be 22.0 ampere hours at 24 volts average per 1,000 calls it is obvious that the total demand for power for the 24 hour day will be 4.5 times 22 ampere hours (4,500 calls at 22 ampere hours per 1,000 calls) or 99.0 ampere hours. By exactly the same method it will obviously require 8.58 ampere hours to meet the busy hour traffic demands (390 calls at 22 ampere hours per 1,000 calls). Now since the busy hour traffic will drain 8.58 ampere hours from the office central battery **in one hour** it will be necessary to install a battery having the next higher ampere normal discharge rate above 8.58. This is because the withdrawal of 8.58 ampere hours **in one hour** from the batterey indicates an **average discharge rate** (for that hour) of 8:58 amperes.

Such an average rate of discharge means, of course, that for some parts of the busy hour the discharge rate will be **above** 8.58 amperes because of the irregular incidence of the traffic load. The size of the battery cells should also insure that the total discharge capacity in ampere hours is above 99.0 and the reasons for this requirement are very similar to the reasons following upon the requirement of the busy hour traffic. A battery of this size will be of sufficient ampere hour capacity to carry the traffic load of the office for 24 hours in case of a continuous interruption in the primary source of energy. If it is desirable, for illustration, that this reserve be expanded to provide for two days the capacity of the battery cells in ampere hours must be increased accordingly. In all probability, however, the twenty-four hour capacity, in view of modern power source reliability, will be sufficient. A battery capacity determined on this basis, moreover, will lend itself perfectly to the method of "floating" the battery on the office and the charging source with a very substantial economy over alternate charge and discharge operation. Should the battery capacity be unduly high, on the other hand, the reserve capacity would, of course, be greater but the difficulty of "floating" operation would be greater. The modern practice, compared with that of twenty years ago, is to install batteries of smaller reserve capacity and to rely upon the primary sources of power being free from sustained interruption.

Too much emphasis cannot be placed on the fact that the battery drain of 22.0 ampere hours per 1,000 calls used in the illustration is illustrative of the **method** only and cannot be assumed to be correct for any given type of equipment nor for any given set of plant conditions. The correct and authoritative figure must be determined for each study and depends on the type of the equipment, the condition of the outside plant and such uncontrollable factors as the average operator answering time and the average subscriber answering time, the average length of conversation, the type and character of the ringing equipment, the average disconnect time and other factors which are not uniform in different areas.

It is clear also that the battery capacity to be provided for any given installation is the maximum indicated by one of the two computations, the one for the twenty-four hour day or the one for the busy hour. In telephone offices having a very large volume of traffic, relatively, in the busy hour it will be seen that the busy hour traffic requirements dictate the capacity of the battery to be installed. Such offices are often found in high pressure business areas where a tremendous amount of traffic is offered during a short day. In offices in which the busy hour traffic requirements are relatively light then it is probable that the capacity of the battery to be installed will be dictated by the twenty-four hour day load. When the type and capacity of the battery has been determined it is easy, of course, to work out the specifications for charging equipment, ringing equipment, private branch installations and other portions of the power load for the office. In working out the power required for 1,000 calls which was used in the illustration the following traffic

(Please turn to page 37)

Announcing the New

COOK TERRA-TERM COOK

FOR DISTRIBUTING UNDERGROUND CABLES

CAPACITY RANGES FROM 26 TO 156 PAIRS IN AND OUT

For Terminating and Distributing Underground Cable at

Airports
Defense and Ordnance Plants
Shell Loading Plants
Firing Ranges
Residential Areas
Parkways
Police and Fire Alarm Systems
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Railroad Communications
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SPEED in assembly and installation, economy and dependability in service are the stand-out features of the new Cook Terra-Term Cable Distributing Unit. The Terra-Term may be quickly assembled in the shop or on the job. Its features include an above-ground terminal chamber containing a Uniflex Cable Terminal with a range of 26 to 156 pair capacity, covered with a steel hood attractively finished in high visibility chrome yellow for complete protection against weather, and locked against tampering. The upper terminal chamber is moisture-sealed after wiring with lead templates and compound. The below-ground assembly of the Terra-Term includes patented "Earth Gripper" plates to insure rigidity without the use of concrete, and a triangular trench chamber which may be filled with sand or gravel to act as a sump. Ingenious design of base irons adds greater strength and firmness. Concrete mountings optional. Write for further details. Terra-Term is distributed by all telephone equipment manufacturers and supply houses.

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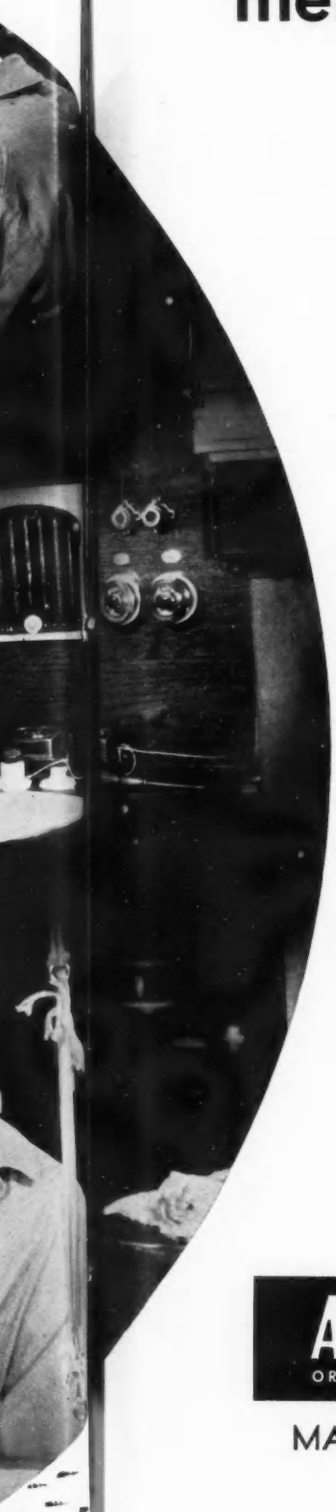
so that your Strowger Automatic equipment will serve better and last longer...



The telephone company that buys Strowger Automatic telephone equipment gets much more than so many pounds of material and so many hours of working time. It gets also the precision, the lasting qualities and the dependability that can come only with long experience and continuous development and research.

In the Automatic Electric Research and Development Department, new methods, new materials and new principles are the objects of constant study and test. Only those which pass the most searching scrutiny and exhaustive analysis receive the final approbation of this staff of skilled research specialists. That is why, over the years, Strowger equipment has steadily improved in performance, why it has constantly kept ahead of service and traffic requirements in the field, and why it is today the most flexible and adaptable type of automatic telephone equipment that it is possible to obtain.

Translated into benefits to you, this means that when you specify "Strowger Automatic" you get equipment that will deliver the maximum in economical, efficient and reliable performance. It is insurance for many long years to come that you will be able to deliver to your users the finest type of modern service, and do it with the most profitable, trouble-free means of operation yet developed.

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Yes SIR-E-E!—"a 4 Star Special" would be an appropriate title for TELEPHONE ENGINEER'S 1942 Spring Construction Issue, which will appear April 15.

Four nationally known telephone writers, are devoting their efforts towards making this important issue extremely valuable to everyone interested in telephone construction work.

These experts will not only tell you what's new in construction short-cuts . . . but, in line with the National Economy Move, they will tell you how to get along on materials you have on hand, or that still are available.

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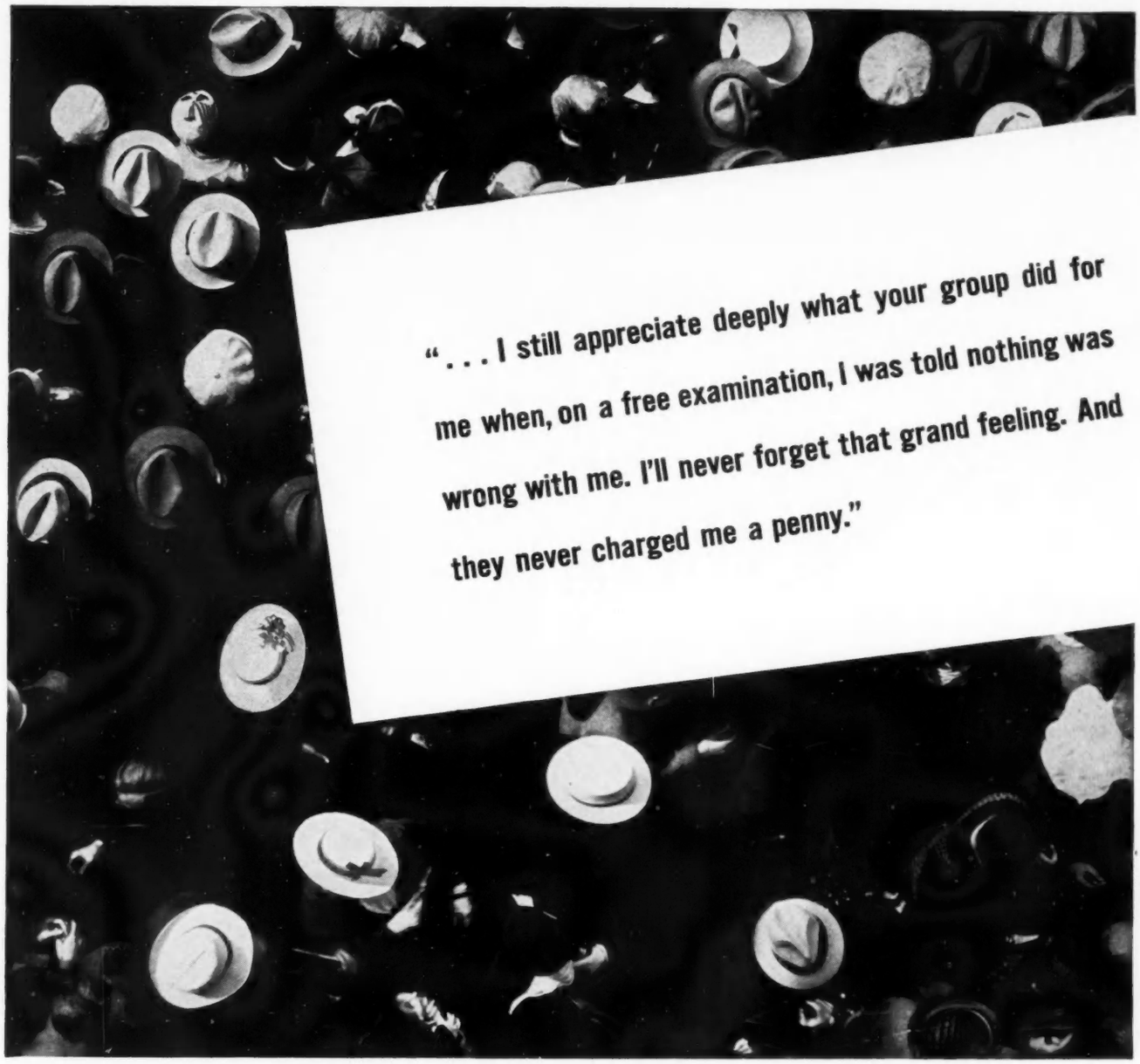
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Your dollar will ease someone's mind. Your dollar will enable a doctor to start treatment in time to effect a cure. Your dollar will help spread the knowledge that *cancer can be cured.* Do your part today and save a life! Enlist in the Women's Field Army. Help in every way you can.

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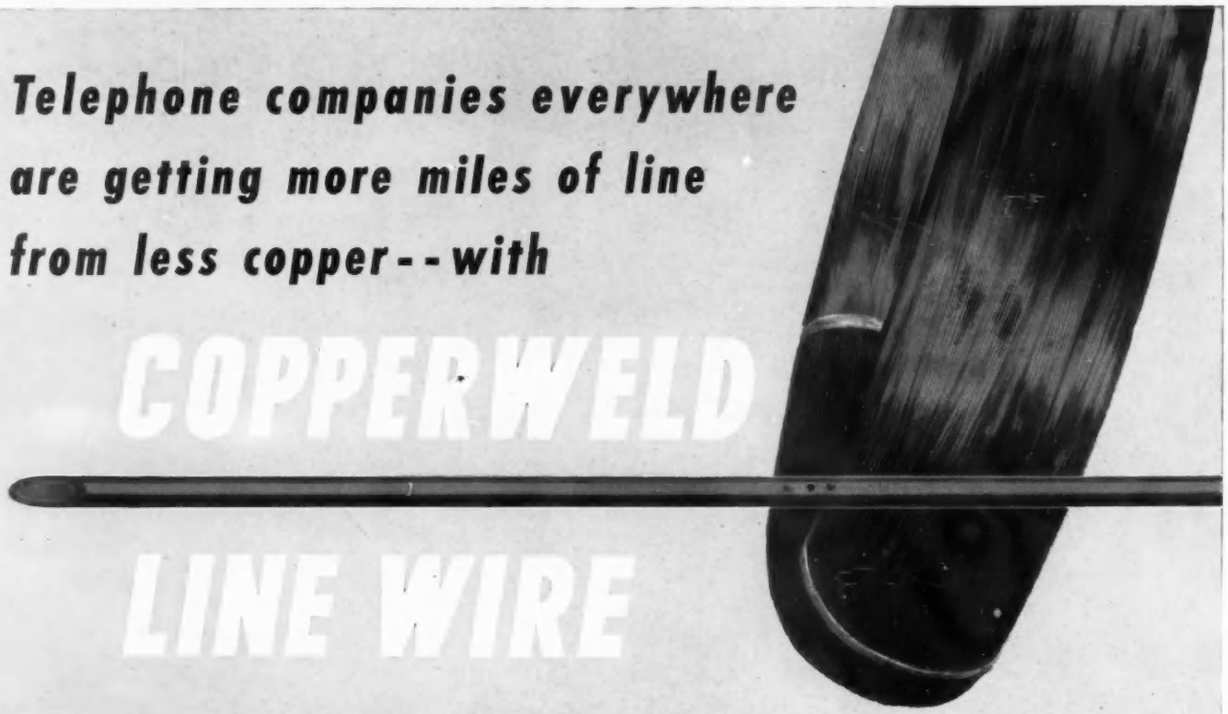
AMERICAN SOCIETY FOR THE CONTROL OF CANCER

New York, N. Y.

(*Contributed by* TELEPHONE ENGINEER PUBL. CORP.)

Telephone companies everywhere are getting more miles of line from less copper--with

COPPERWELD LINE WIRE



Telephone companies are getting more miles of line with less copper by using Copperweld. And not only are they saving copper but they are getting all the Copperweld advantages of high strength, good conductivity, rust-resisting life and easy handling. Copperweld wire is guaranteed to have the rust-resisting life of solid copper. Copperweld wire stays new—its better voice transmission and greater safety are permanent characteristics.

USE COPPER WISELY
do not waste

COPPERWELD WIRE REQUIRES ONLY 30% (OR 40%) COPPER

COPPER WIRE REQUIRES 100% COPPER

COPPERWELD
telephone products
COPPERWELD STEEL COMPANY · GLASSPORT, PA.

Quantatative Design of Central Office Equipment

(Continued from page 30)

averages applicable to plain non-feature common battery manual equipment were employed.

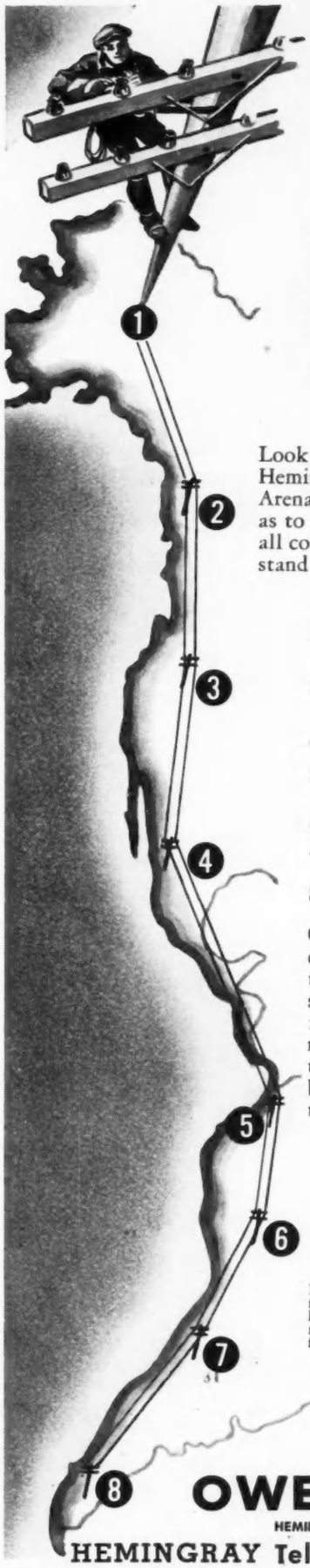
Operator's answering time...	5 sec.
Called subscriber's answering time	10 sec.
Conversation time	150 sec.
Disconnect (time after completion of conversation before connection is removed	10 sec.

SLIGHT consideration of these traffic constants will disclose that they are applicable only to plain non-feature Common Battery equipment. When high-efficiency equipment is used such traffic time elements cannot be used, of course, nor can they be used in the consideration of any type of dial or semi mechanical equipment. The reason for this is that in all high efficiency equipment some of the functions incidental to rendering service become electrical or mechanical and do not call for the interposition of the operator. To the extent that the actual muscular effort of the operator is replaced by electrical and mechanical means the total operating time is certain to be modified. Such functions not only increase the capacity of the equipment to dispose of the traffic demands but they also increase the battery drain. For this reason it is necessary to apply circuit analysis methods to any proposed type of equipment in order to compute the number of ampere hours required for 1,000 calls. When the battery drain per 1,000 calls is known it is easy, of course, to design the power plant using the principles which have been outlined above. The importance of so designing the power plant in the telephone office that it will provide the maximum required rather than the average required is obvious.

Obituary

T. J. Parker, 63, owner of the Garden City (Texas) Telephone Company, died in a Big Spring Hospital, where he was taken two weeks earlier suffering with heart trouble.

For many years Parker had had a prominent role in affairs of the area, and had served two terms as county judge. Twelve years ago he purchased the Garden City Telephone Company, and for the past few years had confined his business activities to affairs of that concern.



TOUGH!

. . . year in year out Hemingrays live through the worst weather Nature can unleash

Look at the tough and varying weather that Hemingrays encounter between Alaska and Punta Arenas. On this imaginary line (imaginary only as to exact location—Hemingrays *are* in service in all countries shown) these famous insulators withstand . . .

1 . . . from 60° below to 90° above

2 . . . the temperature changes of mountain and valley

3 . . . from 18° below in mountains.—115° above in valleys

4 . . . attacks of tropic heat, rain, storms

5 . . . rigors of spanning 7 Andes peaks—19,000 feet high

6 . . . tropical aridity

7 . . . varying regional-temperature changes

8 . . . attack of extremes of damp and cold

Can a glass insulator stand that? Hemingrays can. Using A. S. T. M. procedure, a recent test of stock Hemingrays by Purdue University showed a strength of 3,000 lbs. Fact is, a 100-year old Hemingray insulator could be remelted and made into another insulator that, in turn, would last another 100 years, because time does not affect the structure of their glass.

Sold *only* through principal jobbers.

Hemingray No. 42 . . . favorite for toll lines—its long leakage path keeps rural "toll" lines trouble-free.

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Conducted by B. C. BURDEN, Technical Editor

Line AND Desk

Transmission & Inductive Interference

Q. What is the difference in the characteristic impedance of a 104 copper open wire line and a 109 iron wire line?

A. The approximate impedance of the copper wire line is 710 ohms and of the iron wire line 1569 ohms.

Q. Will the use of a drainage coil relieve severe inductive interference experienced on a 2 wire telephone line involved in a lengthy parallel?

A. In some cases drainage coils will reduce inductive interference. However, in other cases the use of a drainage coil may actually increase the amount of noise on the line. This is particularly true if a drainage coil is used on a line on which there are numerous bad joints thru which the current being drained would tend to set up a voltage unbalance between the two sides of the telephone circuit. It is easy to determine the results that can be obtained from a drainage coil by connecting the coil across the line at the mainframe and grounding the midpoint.

Q. We have a multi-party rural line with ringers connected from each side of the line to ground. The line has recently been paralleled by a power line and is now quite noisy. Is there any way we can reduce the noise without connecting the ringer across the line or changing to high impedance ringers.

A. Yes, it is possible to connect a **gaseous relay tube** in series with each ringer. These tubes are so designed that they act as an open circuit to normal voice current and induced power frequencies, but will ionize at ringing voltages and permit ringing current to pass through them without appreciable loss. The only difficulty which might be experienced with them would be that if the induced power voltage is sufficiently high, they may remain in the ionized condition after the ringing voltage has ceased. If this is the case, they cannot be expected to work satisfactorily.

Q. Several years ago you described the use of a special modified receiver diaphragm having a ¼" hole which causes the receiver to greatly attentuate frequencies below 500 cycles, thereby tending to cut out prominent power line harmonics. Please tell me where I could get this type of diaphragm if it is now available or how I can make up my own.

A. These are ordinary diaphragms having a ¼" hole which is located approximately ⅜" from the edge of the diaphragm. I believe these are available thru the Telephone Repair Shop in Chicago.

Q. What are some of the causes of harmonics on power lines?

A. Harmonics may be due to any one of several causes, viz: (1)—Poor design of the magnetic structure of A.C. motors and generators. (2)—Improper transformer connections. (3)—Overloading of transformers. There are of course other causes of harmonics but these are the principal ones.

Q. Can telephone repeaters be worked successfully on multi-party magneto type farm lines?

A. It is not feasible to use a telephone repeater on farm lines as the impedance of the line varies depending on the number of receivers off the hook, hence it is difficult to balance the network against the line impedance.

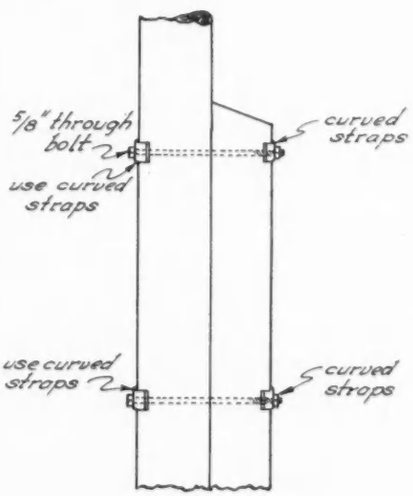
Q. Is there any limit to the amount of gain that can be inserted in a telephone line by means of vacuum tube repeaters?

A. Yes, the gain of the repeater is very definitely limited by the impedance condition on a telephone line! Due to unavoidable irregularities in impedance and the difficulty of balancing the repeater network against the line, the maximum gain must be limited otherwise the repeater will sing. Generally repeaters operate at gains from 2 or 3 decibels to as high as 10 or 12 decibels, although under ideal conditions somewhat higher gain can be realized.

Poles and Drops

Q. Please explain how some companies make use of pole stubs which are attached by long through bolts to the pole to be stubbed.

A. This method of stubbing is suitable for light poles is shown below. You will notice that through bolts are used in conjunction with curved steel straps. If the surface of the pole and stub are shaved so as to present a fairly flat surface at the point where they are in contact and then drawn up tight, this method of pole stubbing will give good results. For larger poles a patented stubbing band consisting of a flat strap with adjustable holes is placed around the pole and stub and then pulled tightly together by means of a through bolt and a short section of pipe as shown.



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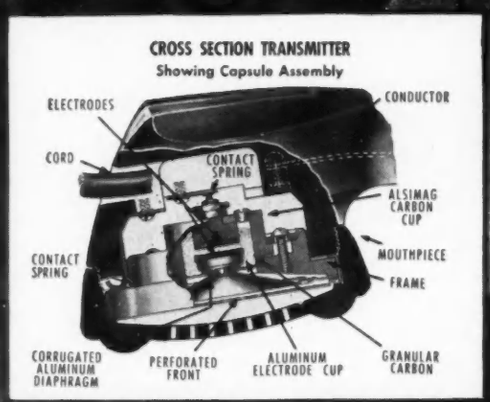
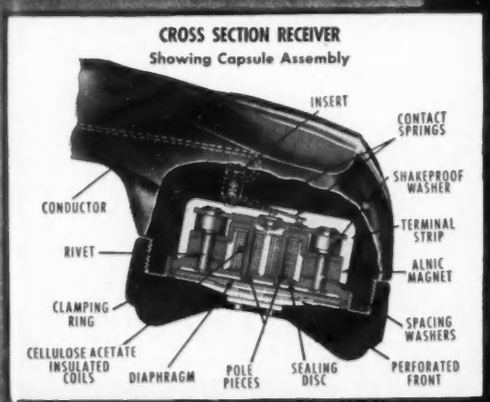
MORE OF THIS LESS OF THIS

Tests Prove Better Articulation Provided by *New* Stromberg-Carlson Handset Telephones





Actual tests conducted with the new Stromberg-Carlson No. 1222 Handset Telephones revealed fewer people asking the other party to repeat than was the case when other types of instruments were used.

This results from the high quality receiver and transmitter used in these telephones in proper combination with the other substation elements. The transmitter is high in fidelity and unusually good on long and short lines, reproducing the voice naturally in any position in which it may be held.

The capsule type receiver provides a smoother, less resonant response frequency characteristic than any other previous Stromberg-Carlson receiver. Improved articulation is secured by placing the resonance peak at approximately 2000 cycles per second while introducing effective damping.

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Conducted by
R. A. Clark, Jr.

Cross-talk Theory

In this the fifth of a series and subsequent articles transposition diagrams will be presented showing the schemes for voice frequency and carrier circuits.

THE discussion in this article will be necessarily limited in order to present the commonly used transposition schemes for voice frequency circuits.

Owing to the extensive power parallels throughout the country practically all telephone lines are now transposed in accordance with the scheme known as the exposed line transposition system. There are three types of sections in use with this system, these are known as the E. L and R sections. The E section is suitable for distance up to about eight miles and requires 32 transposition poles. The L section is suitable for distances up to about four miles and requires 16 transposition poles. The R section is suitable for distance up to about one-half mile and requires 4 transposition poles.

The choice of sections may be therefore divided as follows:

4-8 Miles	E Section
2-4 Miles	L Section
Less than 2 Miles	R Section

Certain circuits in R sections are not very well balanced and it is therefore inadvisable to use them more than necessary. When two or more R sections are adjacent, transpositions may be installed at the ends of the sections to improve the balance. These are known as junction transpositions. The diagrams show the transposition schemes for lines up to 40 wires, which are seldom exceeded.

For those of you who are interested, it will be well worthwhile to check back in the first article on crosstalk (September, 1941 issue) and pick out the types of transposition schemes for different circuits. This will be of value in following future articles where we will discuss the modification of existing

(Turn page please)

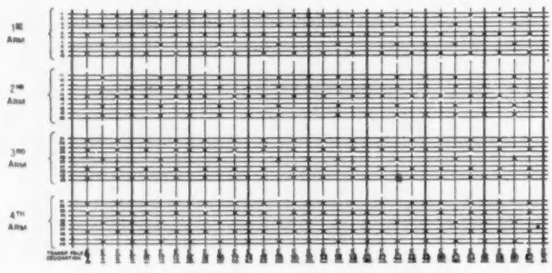

Fig. 1—E section for non-phantomed circuits.

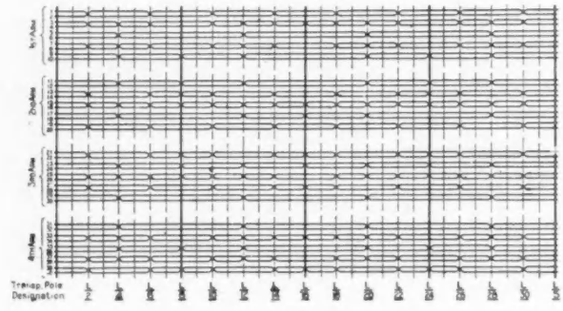

Fig. 3—L section for non-phantomed circuits.

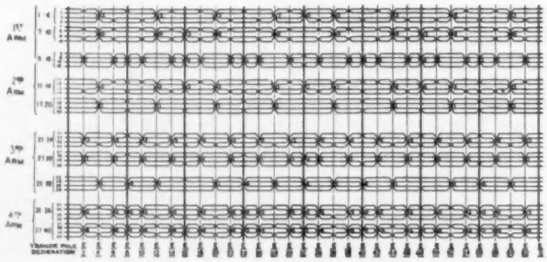

Fig. 2—E section for phantomed circuits.

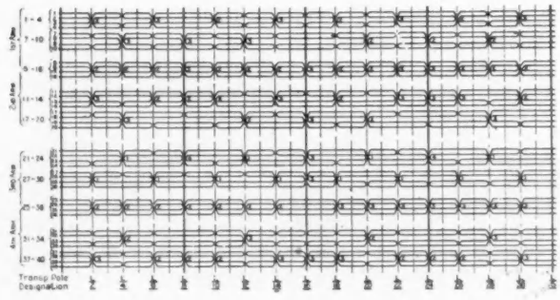

Fig. 4—L section for phantomed circuits.

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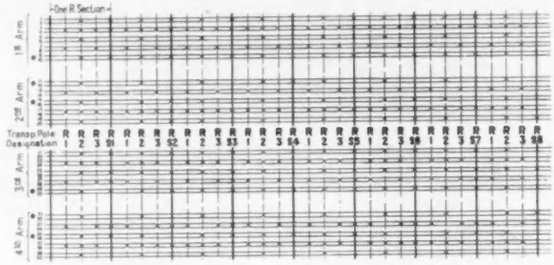

Fig. 5—R section for non-phantomed circuits.

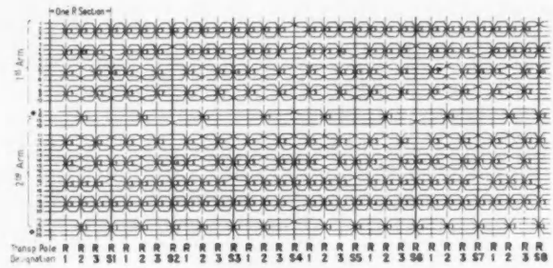

Fig. 6—R section for phantomed circuits—first and second arms.

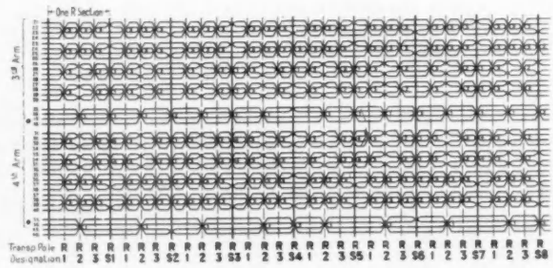

Fig. 7—R section for phantomed circuits — third and fourth arms.

transposition schemes to obtain improved balance. For example in Fig. 1 showing the transposition scheme for non-phantomed wires 19-20 is type B.

Fig. 1 shows an E section for non-phantomed circuits. Fig. 2 shows an E section for phantomed circuits. Fig. 3 shows an L section for non-phantomed circuits, Fig. 4 an L section for phantomed circuits. Fig. 5 shows the scheme for eight R sections in tandem for non-phantomed circuits. Fig. 6 and 7 are the same except for phantomed circuits. When installing R sections in tandem junction transpositions shown in these figures should be used except at the last S pole. In other words if there were four R sections followed by an L section, junction transposition would be installed at the S1, S2 and S3 transposition points but not at the junction between the last R and the L section.

— END —

Texas to Hold Two-Day Convention in Dallas

The annual convention of the Texas Telephone Association will be held on the 18 and 19 of this month at the Adolphus Hotel, Dallas, Texas. A very good program has been arranged and officials of the association expect good attendance.

Headed as president by Oscar Burton, vice president of the Gulf States Telephone Company, Tyler, the Texas association felt that war times justified their reducing their regular 3-day convention to only two days this year and have notified their members of the change in dates.

Madison, Wis., Votes $10,000 for Telephone Rate Case

The Madison, Wis., City Council this week voted a fund of $10,000 to conduct its investigation of the proposed increase in rates in that city by the Wisconsin Telephone Co. and engaged Harold M. Wilkie, former telephone rate counsel of the state commission, as its counsel in the inquiry. It is estimated the Wisconsin Telephone Co.'s rate proposal would increase residential rates by around $300,000 a year. The state government agencies would pay $27,000 more a year and business subscribers under the projected metered plan would pay an added $25,000, according to statements of opponents of the rate increase.

Resumes Probe of Telephone Rates

The El Paso City Council is resuming hearings April 1 in its probe of the telephone rates in that city's area of the Southwestern Bell. It is expected that the complete case on the reproduction cost new of the Southwestern Bell plant in El Paso and the separation of the exchange and toll property in the city and its surroundings area will be presented.

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Personals from the Field

E. A. Hanover, vice president in charge of production, Stromberg-Carlson Tel. Mfg. Co., left Rochester last fortnight with Mrs. Hanover, for a Florida vacation. He reports the Stromberg-Carlson plant almost completely converted to wartime production with finishing touches being added. **Lloyd L. Spencer,** general sales manager, of Stromberg-Carlson Tel. Mfg. Company, and Mrs. Spencer also left for a short stay in Miami, Florida.

•

Claud Smithpeter, manager of the Geary (Okla.) Telephone Company, was the sponsor of a district meeting of the Oklahoma Telephone Association convention held in Geary, on March 6. **J. W. Walton,** vice president of the Oklahoma Telephone Co., was toastmaster at the noonday luncheon.

•

Edward Cooper has been made assistant secretary of the FCC to replace J. B. Reynolds who resigned over a year ago. **Charles E. Denny, Jr.** has been appointed assistant general counsel for litigation of the FCC. He is 30 years of age and comes to the FCC from the Lands Division of the Justice Department. He succeeds **Thomas Harris** who has gone to the Price Administration.

•

The Halsey, Ore., telephone exchange has changed hands. **Gaylord E. Baker** of Scappoose, owner of the Scappoose Telephone Company, has purchased the stockholders' interest in the Halsey Telephone Company. The Halsey plant was very badly damaged by the sleet storm last month.

•

Thank you, **Leslie Gritten,** secretary of the Oregon Independent Telephone association, for recommending your membership to our February 1 issue and its contents.

•

W. B. T. Belt, 71, former president of the Northwestern Bell Telephone Company, died early Sunday, February 8, in an Omaha, Nebr., hospital.

After serving the telephone industry nearly 48 years, he retired on August 31, 1936. At one time he was president of the Telephone Pioneers of America.

•

Gerald Benham is the new manager of the Mutual Telephone Co. of Oreene, Okla., succeeding **F. S. Christman,** manager for the past 20 years, who has retired.

Lt. Nelson D. Stoker

Lieutenant Nelson D. Stoker is now stationed at the Q. M. Motor Supply Depot, Little Rock, Ark. **"Nelse"** has been representing the James R. Kearney Corp. of St. Louis for the past few years and is now on leave of absence for the duration. If you want to drop him a line address him as above at Box 3141, Little Rock, Ark.

•

Horace Whettle, 45, a member of the technical staff of the Bell Laboratories in New York, died Feb. 19, of a heart attack. He was credited with 23 patents in the line of communication development.

•

Elvin Durr, district manager of the United Telephone Co., has suffered a relapse of pneumonia at his home in Mound City, Mo.

•

H. L. Whitney, Superior, Nebr., was high man among all plant employees of the Lincoln (Nebr.) Tel. & Tel. Co. in telephone sales during 1941. He sold 141 telephones during the year and his record was only surpassed by one or two commercial salesmen throughout the entire system.

•

L. C. Throop, district manager of the Southwestern Associated Telephone Co. at Brownfield, Texas, has been transferred to the Goose Creek, Texas, area of that company as an engineer. **Mills Roberts** of Guymon, Okla., will succeed him at Brownfield.

•

Homer Cree, 49, manager of the telephone company at Green, Kansas, for the past 25 years, died of heart attack early in February, according to newspaper reports.

•

Albert Schulte, manager of the St. Marys, Kans., exchange has returned to duty following an absence of ninety days, during which period he was convalescing from an operation.

•

A. G. Weaver is the new manager of the Dwight (Kans.) Mutual Telephone Co., succeeding **R. C. McGuire,** manager for the past 29 years.

•

John K. Stoltzfuss, president and general manager of the Conestoga Tel. & Tel. Co., has authorized additional equipment for that company's Boyertown, Penn., exchange.

•

DeWitt C. Tanner, for many years head of the Western Electric Company's patent department and more recently consulting patent counsel for both Western Electric and the American Telephone and Telegraph Company, concluded his 40-year Bell System career when he retired March 1.

•

Reid M. Bennett, 62, engineer with the Illinois Bell and Western Electric Co., died Feb. 14 in Chicago.

•

Henry C. Beal, now manager of the Western Electric Company's Kearny, New Jersey, Works, became engineer of manufacture on March 1st with offices at the Company's headquarters, 195 Broadway, New York City. He will be succeeded as Works manager by **Reese F. Clifford,** personnel director for the past year.

•

"Are you reading TELEPHONE ENGINEER? You can run your business better if you do." was not written by us. It was a part of the News Bulletin of the **Michigan Independent Telephone Association** issued Feb. 13.

•

George W. Behner, district plant superintendent in Akron, has been transferred to Cleveland, Ohio, having been promoted to general plant employment supervisor for the Ohio Bell northeastern area, a position made vacant by the recent death of **Henry L. Meade,** of Cleveland.

•

Application of **Russell Laube** to pur-

chase the exchange at Mokane, Mo., from **C. E. Cooper** has been granted and the trade completed.

•

Bill Miller and **Elmer N. Brown** have applied for permission from the Missouri Commission to buy the Ozark Telephone Company of Dudeville, Mo., from **John W. Jones.**

•

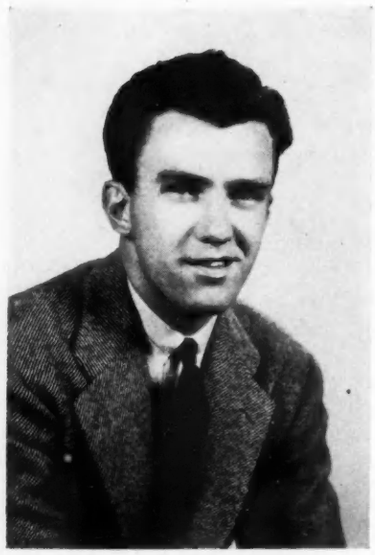
R. C. Dodd, 58, Oak Harbor, for the Northern Ohio Telephone Co., died in his home Feb. 10. He is survived by his wife, Nellie, and a daughter, Mrs. James Felton.

•

The Timber Telephone Company of Timber Oregon was recently purchased from **Mrs. Mary Turley** by **Mr. and Mrs. John Shriner.** Mr. Shriner was formerly the electrical maintenance engineer for the Oregon-American Lumber Corp. at Vernonia, Oregon. Mrs. Shriner will be the day operator and bookkeeper.

•

William R. Gard, the chap who always greets you at the Ohio Independent Telephone Association convention each year as assistant to Frank L. McKinney, is the new executive secretary of the Akron Junior Chamber of Commerce. He was active in JayCee work in Columbus and is well fitted for his new position.



Morris Burton

Morris Burton, assistant manager of the Gulf States Telephone Company and son of the well known **Oscar Burton** of Tyler, Texas, is now in Army service as a civilian telephone engineer at Ft. Sam Houston, Texas. A graduate of Texas A & M with a degree in electrical engineering, **Morris,** who grew up in the telephone business, should be of inestimiable value in the office of the Signal Officer of the Headquarters 8th Corps Area where he is now stationed. His company granted leave of absence "for the duration." **Morris** is also a first lieutenant in the Officers Reserve Corps, in the engineering branch, U. S. Army.

•

Jack Winemiller, son of our old friend **Pete Winemiller** of Stromberg-Carlson, is now a Yeoman in the Naval Intelligence Department stationed at Balboa, Panama Canal Zone. **Pete** and the **Mrs.** also have another son in the service, **Lt. Perry Winemiller,** who is an air corps flying instructor.

•

Obituary

C. Y. McVey, 71, a veteran in the public utility field and first president of the United States Independent Telephone Association, died February 22, at his home in Cleveland, following an illness of two years.

A native of Youngstown, where he worked from 1894 to 1899 as assistant to the operating head of the Mahoning Valley Railways, Mr. McVey learned about railway affairs there. He learned about franchise worries, rates and political angles of the utility field as chief executive for several large independent telephone companies before their absorption into the Bell system.

He experienced a brief but stormy career as traction commissioner, however, when he blasted Mayor Davis' "dream" of a 5-cent car fare, recommending that the fare structure be modified and improved rather than replaced by any flat or zone fares.

Reorganized Phone Companies

After resigning as traction head Mr. McVey became associated with Morton J. Stone in a brokerage office opened for Cleveland and nearby communities by Carl M. Loeb & Co., New York Stock Exchange house.

In 1900 Mr. McVey was engaged in reorganization of the Youngstown Telephone Co., and he was brought to Cleveland to take charge of the telephone properties controlled by the Everett Moore syndicate. Later, when the Morgan interests bought up the independent Ohio lines and consolidated them into the Ohio Telephone Co., he became president of the company in 1916, at which States Independent Telephone Association.

In 1930 Mr. McVey became president of the United Telephone Co. and moved its offices to Cleveland, where operations were directed until 1931, when he sold out.

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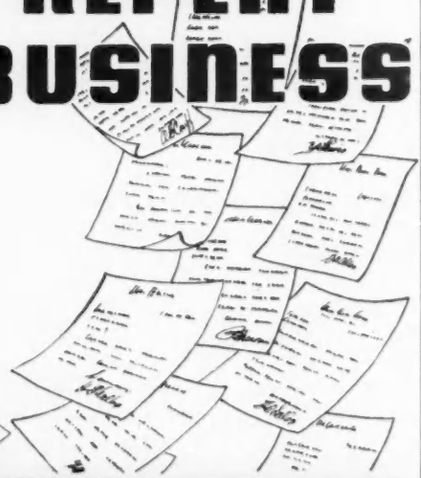

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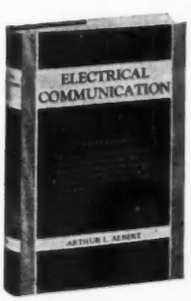

A study of the various specialized phases of electrical communication as related to the usages of modern communication systems. Nearly one-third of the content has been entirely rewritten and the remainder revised to incorporate recent advances. The main revision occurs in the chapters on Sound and Acoustics, Speech and Hearing, Electronics and Vacuum Tubes, Inductive Interference and Plant Protection, Electronic Applications in Wire Communication (especially the sections on Carriers and Repeaters), and Wireless Communication.

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Highlights of Communications News

(Continued from page 23)

for the use of those who are charged with responsibilities for the public health, welfare or security.

"(5) Empty party-line service in those instances where party-line installation will conserve scarce and critical materials.

"(6) Discontinue replacements or additions to existing plant for the betterment or relocations of such plant, except to replacements essential to the maintenance or protection of service.

"(7) Conserve or re-use existing telephone equipment and facilities, whenever such conservation or reuse will reduce the use of scarce and critical materials.

"(8) The order, effective immediately and in force until revoked, does not affect changes in equipment or facilities which actually were underway at the time of its issuance."

Heavy Tax Burden

THE heaviest burden of taxes in its history faces the telephone industry as it does every other American business and individual in the new War Tax bill recommended to Congress by Secretary of the Treasury Morgenthau. But the telephone industry need not think of the Treasury Department's tax program as already "cooked and served" to it because Congress is none too pleased with it. Furthermore, the tax bill in its final form will probably not be enacted by Congress until this summer. The House Ways and Means Committee which is framing the measure in its initial stage probably will not complete that task until mid-April or May; then the House is not expected to pass the bill until June; the Senate will take a month or more on the bill—so late July or August is a good time to expect the tax measure in its final form.

Excise Tax Proposals

THE excise tax proposals of the Treasury Department, which include sharp increases in the existing levies on local exchange and toll service, may be taken up by Congress and placed in a separate tax bill apart from the corporation and individual income taxes so that the excises can be increased during the current taxable year. This step has been proposed by Chairman George of the Senate Finance Committee and would mean that among the proposed excise taxes Congress would consider the sharply increased levies on telephone service.

The telephone excises proposed by Secretary Morgenthau were as follows:

Local telephone service from present 6% to 10% (the 10% levy was originally proposed in the last year's tax bill but was reduced by the Senate to 6%.

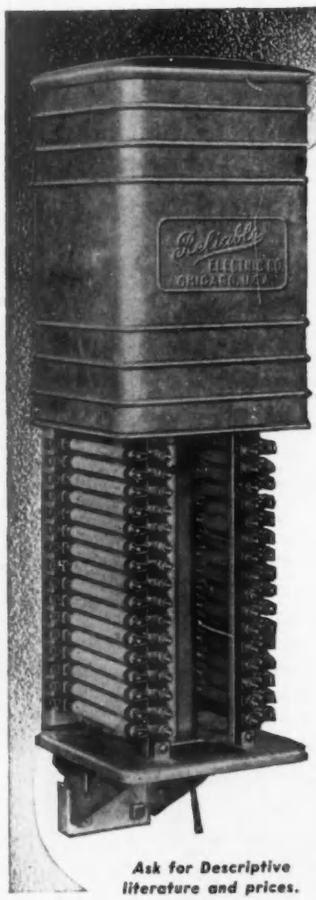
Long Distance telephone service—the increases would be, instead of the present rate of 5 cents on calls from 24 to 50 cents and 5 cents additional on each 50 cents of toll charges, 25 to 29 cents . . . 5 cents tax; 40 to 60 cents . . . 10 cents tax; 65 to 99 cents . . . 15 cents tax; and five cents additional tax for each 25 cents or fraction of additional toll charges.

Coin-operated telephones for calls up to 25 cents charges would have a 10% tax placed on all collections for such calls. This tax is expected to be charged against the telephone companies direct as there would be no way to collect the excises from the users of pay stations. Because of the difficulties of administering this tax which should be rightfully passed as an excise to the user, it is likely that this levy may be eliminated by Congress.

The Treasury has estimated that the increased amount of tax revenue from the long distance toll levy, coupled with the proposed 15% tax on telegraph messages (now the excise on telegrams is 10%), will be $245,000,000. Revenue from the 10% levy on the local telephone service is estimated at $46,600,000. The coin-operated telephone tax would produce $6,700,000, it is estimated.

Corporation Tax

THE increases in corporation income taxes will amount to a 40% boost over the existing levies, Secretary Morgenthau's proposals noted, with an estimated yield of $3,060,000,000. Randolph Paul, tax adviser to Secretary Morgenthau, told the House Committee that the estimated corporation net income for the coming fiscal year was $18,200,000,000 and stated that the tax load to be borne by corporations would be about $10,200,000,000. **Thus, if the Treasury's proposals are incorporated into law, it will mark the first time that the nation's corporations will have turned over more money to the Government than in dividends to their stockholders.** The normal corporation income tax, up a maximum of 24% for those with a net income over $25,000, would still obtain. The surtax, however, would be upped sharply, to 31% for concerns



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with net income of over $25,000. Those making less than $25,000 net income would pay 16%, instead of the existing 6%. A relief provision for corporations whose surtax net income would be less than that for the base period of 1936-39, granting them a tax credit of 10% of the difference, not to exceed 20% of the surtax net income, was included in the proposals. This would apply only to corporations with net incomes of more than $25,000. Mr. Paul declared that the maximum tax obligation of any corporation under the proposed levies would be 88.75% of its net income.

Excess profits tax rates are to be up 15% in each bracket under the Treasury proposals, to a maximum of 75% for companies earning more than $500,000 in excess profits. The same credits included in existing legislation, computed either on the invested capital or average income in the base period of 1936-39, would apply.

Pensions

THE pension trusts of American industries, including telephone and telegraph companies, may become a target of Federal taxation, it was indicated in Secretary Morgenthau's proposal on such taxation which will be recommended later to Congress. Randolph Paul, his tax adviser, told the House Committee that "the tax avoidance potentialities of pension trusts are well known."

"The use of these trusts," he said, "as a tax saving device for key officers and employees has been stimulated by increasing rates of tax. To prevent such tax avoidance we suggest that a trust should be required to meet the following standards in order to be tax exempt: (1) The right of the employee to his portion of the employer's contribution to the trust, and to its earnings, as well as to his own contribution should be fully vested; (2) The trust should cover either (a) 70 per cent or more of all employees, excluding employees who have ben employed for less than a minimum period not exceeding five years, and casual, part-time and seasonal employees, or (b) such employees as qualify under a classification set up by the employer and found by the Commissioner not to be based upon any favoritism for employees who are officers, shareholders, supervising employees, or highly compensated employees; (3) The system of contributions and benefits under the trust should not discriminate in favor of officers, shareholders, supervising employees or highly compensated employees; and (4) If the pension benefits of an employee in such a tax exempt trust exceed, let us say, $7,500 a year, such employee should include in income currently his pro rata share of the employer's contribution to the trust and of the earnings of the trust."

Signal Corps Status

THE Signal Corps is continued unchanged in its identity and adminis-

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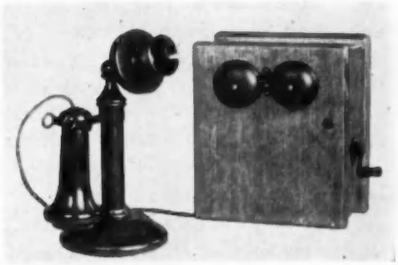
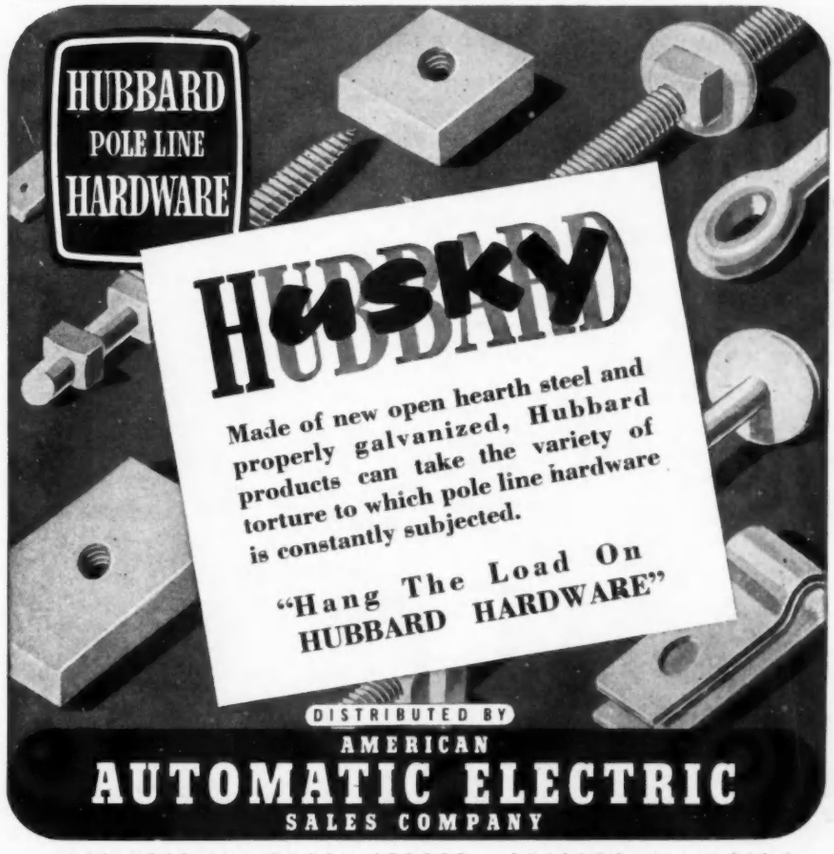
VICTORY

IN THE TELEPHONE BUSINESS, as in war, depends on using the best equipment you can get. In "Remanufacturing" Suttle gives you the best use of salvage telephone parts. It costs a little more. So does Victory, but it's worth it.



DEPEND ON SUTTLE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BRANCH WAREHOUSES AT DALLAS, KANSAS CITY, LOS ANGELES, RICHMOND (VA.) AND SAN FRANCISCO

tration in the Army under the new "streamlining" operational scheme which Secretary of War Stimpson has put into effect, except that it will be directly responsible to Major General Brehon D. Somervell, the new Commander of the Services of Supply. Under the previous structure of the Army the Signal Corps has been responsible to General George C. Marshall, Chief of Staff.

The placing of the Signal Corps under the Services of Supply was considered a most logical step in the new move to streamline the administration and leadership of the Army to meet the imperative needs of the conduct of the war. The new move is featured by the placing of the Air Corps on the same level and equal representation as the Ground Forces, in recognition of the vital and paramount role of the air force in modern warfare and by the stripping away of administrative duties and details from the General Staff of the Army so that it will be able to concentrate entirely on planning military moves and war strategy. The General Staff, in this role of concentration upon war strategy, is to be reduced drastically in size from its present strength of over 500 officers to a closely knit group of 98 key strategists tactical expert officers.

Because of its tremendous assignments and tasks of the Signal Corps in procuring the supplies of wire and radio communications apparatus and equipment for all arms and services of the Army, it was a natural and logical sequence that it is slated to be placed under the Services of Supply. In coming under General Somervell, who has made a most excellent record in the administration of the Army construction program, the Signal Corps now will be directly responsible to a single commanding general and should be relieved of its present situation of contacting a number of agencies and branches.

The placing of Signal Corps troops in the field under the Air Corps and Ground combat arms is exactly what has existed in the past. The Signal Corps officers and troops in the field and with the combat arms are under the command of the Army, Corps and Division Commanding Officers. The Signal Corps, however, is expected to continue the training of the Signal troops for all arms and the formulation of the communications operational methods and procedures.

There will be NO change, it is believed, in the relationships of the Signal Corps in the utilization for the Army's needs of the facilities and systems of the commercial telephone, telegraph and radiocommunications companies.

The placing of the Signal Corps under the Services of Supply has a precedent in the First World War. When the AEF General Staff activities of General Pershing at Chaumont became too complex, he had the Services of Supply moved to Tours under the command of Major General James G. Harbord. The Chief Signal Officer of the AEF was likewise transferred to Tours at that time.

An extremely able Signal Corps officer, Brigadier General Frank E. Stoner, who has been in recent months the commanding officer of the Signal Corps Replacement Center at Fort Monmouth, has just been appointed by Major General Dawson Olmstead, Chief Signal Officer of the Army, to be chief of the Army Communications Service Branch which coordinates the commercial communications companies with the Army's needs. General Stoner has charge of organizing the operation of Army posts and camps telephone systems by the private telephone companies which are now taking over at various posts in different sections of the country the complete operation of telephone service under a new Army policy.

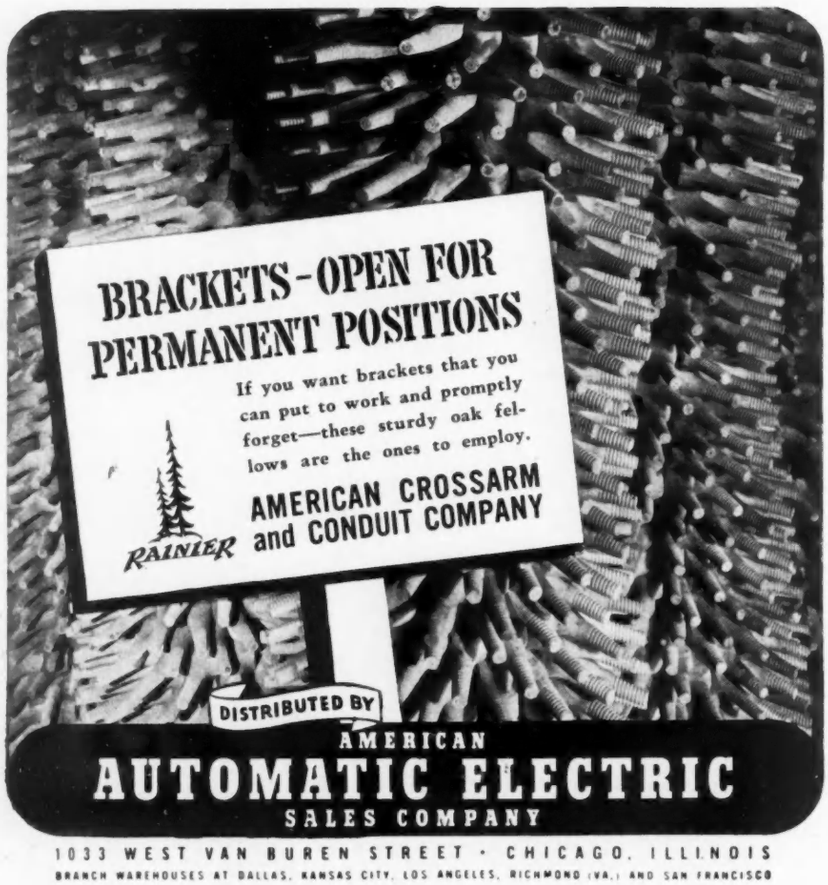
Hearing on Hotel Charges

IN what may be the launching of a nationwide investigation of the special service charges imposed by hotels, apartment houses and clubs upon their guests for their long distance telephone calls, the FCC on April 1 is holding a hearing on the issue of whether or not it has jurisdiction over such special charges.

The FCC is going to make a "guinea pig" by a probe of the Washington, DC., hotels, clubs and apartments in the special charges which they impose on their guests' telephone calls. The District of Columbia Public Utilities Commission is joining with the FCC in the inquiry because the District regulatory body is endeavoring to establish its power to regulate the special charges of hotels over local telephone calls. If the FCC does decide it has this authority, it will launch a nationwide probe of the hotel charges. The telephone companies may be forced, if the FCC takes over the hotel rate regulation, to file tariffs showing the hotel special charges along with their regular toll rates.

FCC Activities

The FCC has hardly relaxed its regulatory activities despite the war. This hotel charge inquiry is following closely on two hearings before Commissioner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Paul A. Walker as to whether the FCC can require telephone companies to seek its permission under Section 214 of the Communications Act in the installation of carrier systems. At one hearing early in March the American Telephone and Telegraph Co., presented evidence to show the great distinction between carrier systms and physical wire construction and the FCC engaged in cross-examination of their testimony on March 25. Another hearing on the latter date—the long-attempted complaint of the Oklahoma - Arkansas Telephone Co. against the Southwestern Bell seeking physical toll connection with the nation's long distance system—is to be held at Fort Smith, Ark., although the FCC previously had found the Oklahoma-Arkansas company's complaint groundless and the Interstate Commerce Commission, the U.S. Supreme Court and two state commissions in the past have made the same finding.

Station Gain

There was a gain of about 106,900 telephones in service in the principal telephone subsidiaries of the American Telephone and Telegraph Company included in the Bell System during February, 1942.

The gain for the previous month was 109,500 and for February, 1941, 118,600. The net gain for two months this year totals 216,500 as against 247,800 for the same period in 1941. At the end of February this year there were about 19,057,900 telephones in the Bell System.

Obituary

A. J. Adams, 59, manager of the Lucas County Telephone Co., Chariton, Ia., and past president of the Iowa Independent Telephone Association, died Feb. 8, at a Des Moines hospital from heart trouble.

Mr. Adams was very civic minded and was active in the work of his local Rotary and Chamber of Commerce, having served as president to both. He was an active worker in the Methodist Church, a Mason and had served as a member of the City Council. Under his managership the telephone company was expanded, the building remodeled and countless other improvements made.

Born in 1883 on a farm near Stanberry, Mo., Mr. Adams started in the telephone business as a lineman for his father who operated a system at Pattonsburg, Mo. He was married to Stella Zentz in 1903. Moving to Chariton in 1915 he served as manager of the Lucas company until his death.

In reporting the death the secretary of the Lucas County company, Hazel Gillaspey, mentioned that the entire staff of the telephone company considered Mr. Adams one of the most wonderful men and employer they could possibly have.

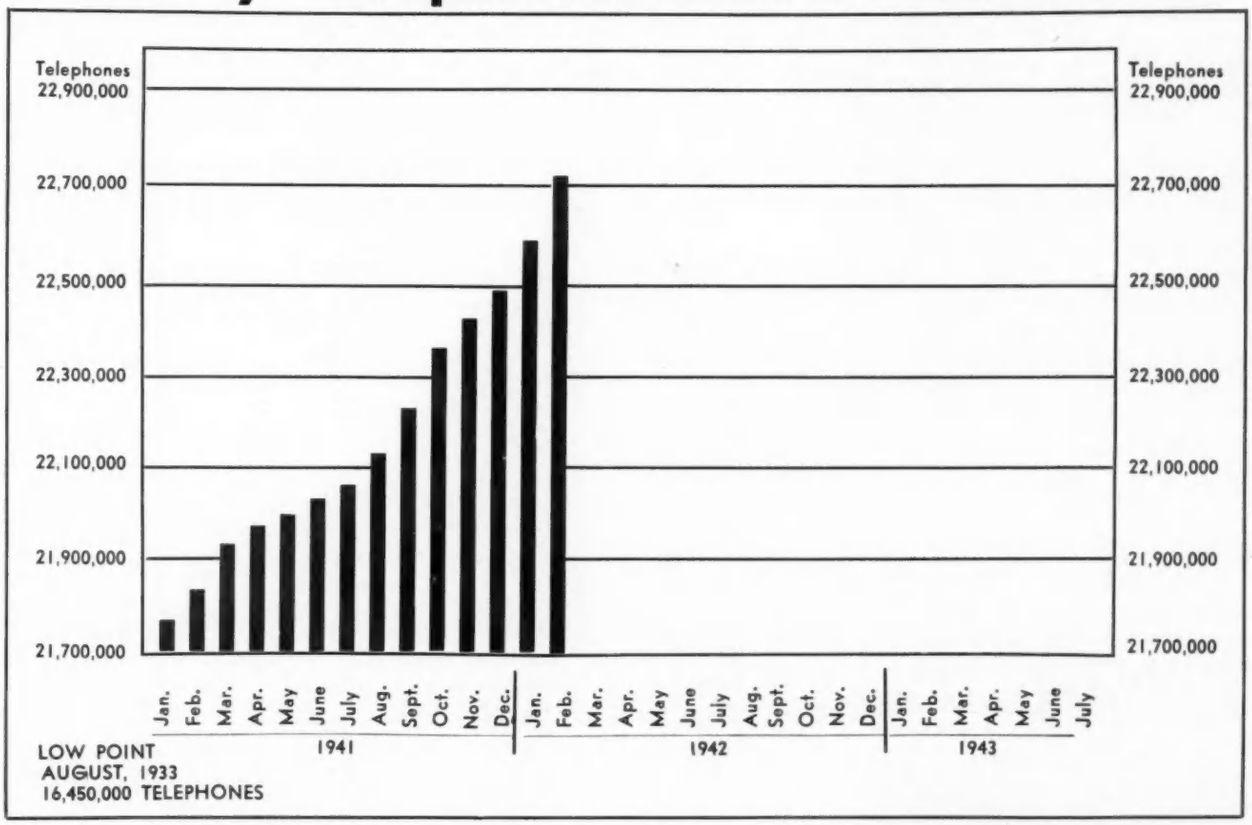
Surviving are: Mrs. Adams; two daughters, Mrs. R. J. Yaeger, Marinette, Wis., and Mrs. L. D. Yaeger, Ottumwa, Ia.; one grandchild; one brother and three sisters.

Utah Commission to Begin Hearings On Intrastate Tolls

The Utah Public Service Commission is to start hearings March 23 in its investigation of the differential between the intrastate toll rates of the Mountain States Telephone and Telegraph Co. and the interstate tariffs of the American Telephone and Telegraph Long Lines. The Commission is charging the Mountain States company with discrimination in its higher level of intrastate toll rates.

The investigation commenced last October when the commission ordered the Mountain States company to reduce its toll rates in Utah to the Long Lines level. The company filed an answer supporting the intrastate rates and asked dismissal of the proceedings because of the national emergency.

Monthly Telephone Station Barometer



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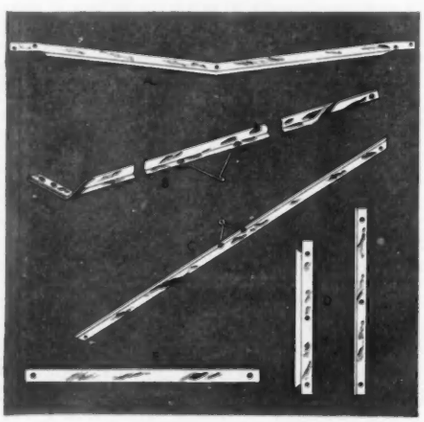

A—Cross Arm Back Brace
B—Alley Arm Brace
C—Diagonal Brace
D—Vertical Braces
E—Flat Cross Arm Brace

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Makers of Pole Line Hardware Since 1894
PITTSBURGH, PENNSYLVANIA

Wire Chief's Training Course

(Continued from page 27)

cur during manufacture, the purchaser will be sure of the full number of pairs specified.

The cable core is heated to drive out all moisture and it is then run through a lead press which molds a lead sheath around the core. Coming out of the lead press the cable is placed directly on a wood or steel reel. While cable can be obtained in any desired length, the manufacturer usually specifies the maximum number of feet of cable to be placed on a standard reel. Mechanical data covering standard lengths, reel, lead sheath, weight, outside diameter, for the various size cables is given in the accompanying tables.

Supply catalogs generally specify the mutual and grounded capacity of various types and gauges of telephone cable. The term **mutual capacity** refers to the capacity effect between the two wires of a cable pair. **Grounded capacity** refers to the capacity of one wire measured against all other wires grounded to the sheath. The chief interest in capacity is its effect on transmission and this is governed by the mutual capacity. The mutual capacity varies from .06 to .09 M.F. per mile and the capacity of any cable depends on the nature of paper insulation used and whether or not it is a single or double wrapped insulation and the tightness with which the core is pressed. The tighter the core, other factors remaining equal, the higher the mutual capacity. A single wrap insulated cable has a higher mutual capacity than double wrapped because the two wires in the former are closer together.

Mechanical Data

Tables 1, 2, 3 and 4 giving mechanical and electrical data for 19, 22, 24 and 26 gauge cable.

(Editors Note: Next section of the Wire Chief's Course will be in the April 15 issue.)

Communications Technicians' Draft Status

The DCB's Industry and Labor Advisory Committees still are studying the plan for the necessity of securing deferments from selective service of skilled technical employees in the various communications services, but no further joint meeting of the committees has been scheduled. It will be recalled the DCB two weeks ago suggested to the Selective Service headquarters that a memorandum on deferment of essential radio broadcast engineers be distributed to the local local draft boards and this memorandum is now in the process of formulation by the Selective Service National Headquarters.

Course Examination No. 12
CABLE CONSTRUCTION—PART I

1. **Is it feasible to use 26 gauge cable in the small exchange?**
2. **Explain the difference in the application of ordinary paired and quadded cable.**
3. **Is it safe to place ordinary lead covered cable directly in the soil?**
4. **For what type situation is the use of Jute protected cable particularly well adapted?**
5. **Describe the essential difference between Pulp insulated and spiral wrapped paper insulated cable?**
6. **What is meant by the term "mutual capacity" of a telephone cable?**
7. **What governs the capacity of a telephone cable?**
8. **Which is the most important factor—mutual or grounded capacity when considering the purchase of telephone cable?**
9. **What is the maximum number of feet of 100 pr. 24 ga. cable that can be put on one reel?**
10. **What is the purpose of "tip cables"?**

Frank Warren Appointed to NARUC Post

By ROLAND C. DAVIES

FRANK B. WARREN, principal attorney in the Common Carrier Division of the FCC Law Department, was appointed this week to be the Assistant General Solicitor of the National Association of Railroad and Utilities Commissioners. He leaves the FCC Mar. 15 for his new post.

In announcing the appointment Mar. 3, John E. Benton, NARUC General Solicitor highly praised the ability and experience, both in state commission and federal regulation work, of Mr. Warren. The new NARUC Assistant General Solicitor served with the Nevada Public Service Commission from 1920 to 1931 during eight years of that period being the Secretary and Rate Expert. He then became Attorney-Examiner for the Interstate Commerce Commission in its valuation bureau from 1931-33. For the next four years he served on the legal staff of the Reconstruction Finance Corporation. In June, 1937, Mr. Warren joined the legal staff of the FCC and specialized entirely during his FCC service in telephone and telegraph matters.

His background in Federal Government service is particularly valuable to the NARUC because he has had much to do with the cooperation activities and proceedings between the FCC and State Commissions. He is felt to be aware of the best means of Federal-State cooperation and of the lines of demarcation which should exist in the regulatory activities of the respective commissions. NARUC General Solicitor Benton in announcing the appointment commented that, because the State Commissions and the NARUC Special War Committee are slated to have much business with Federal agencies during the war period, Mr. Warren's experience and acquaintance with Federal Commissioners and departments in Washington make him particularly well fitted to be helpful in that work.

The departure of Mr. Warren from the FCC means the loss of a leading legal expert in that Commission on telephone and telegraph matters. During his FCC service, Mr. Warren handled the 1940 rate reduction case against the Pacific Telephone and Telegraph Company and was the principal attorney in the negotiations with the American Telephone and Telegraph Co. which resulted in the $14,000,000 toll rate reduction last year, after the sweeping investigation program, planned by former FCC Rate Counsel Harry Booth, was scrapped. He also participated in the FCC inquiry regarding the proposed 15% telegraph rate increase and in the international urgent rate proceedings as well as in the preparation of the FCC report on the telegraph merger legislation to the Senate Interstate Commerce Committee. Recently, Mr. Warren has been engaged in the joint FCC-State study of simplification of telephone property separation methods.

During the latter part of 1941, Mr. Warren had been mentioned for an appointment to the District of Columbia Public Utilities Commission, but his Nevada citizenship precluded his consideration for that appointment. Senator McCarran of Nevada introduced a bill to change the statute which requires such appointees to be residents of the District, but the measure was not enacted.

It was announced that Mr. Warren had been appointed with the expressed approval of NARUC President James of the Missouri Commission and Chairman Matson of the Minnesota Commission who heads the NARUC Executive Committee. Mr. Warren, who is 45 years old, was born in Wisconsin and studied at the San Diego Business College and at the University of Nevada. He was admitted to the Bar in Nevada in 1923 and served during the last war in the U. S. Army Air Service for two years.

24 FM Stations on Commercial Operation

A census of frequency modulation broadcasting stations and receivers in civilian hands, conducted by FM Broadcasters, Inc., and made public last week, reveals that 24 FM stations are now in commercial operation, with six others nearly ready for commercial use, and 10 operating on an experimental basis. Forty FM stations are now under construction, with 55 applications pending. While the construction of new standard broadcast stations has been frozen by FCC-WPB order, no specific policy regarding other forms of radio service, like FM, has been announced.

The survey also revealed that 255,000 FM receivers are now in public hands, in addition to those operated by the military services. Of those, 50,000 are situated in the New York area. Upwards of 200,000 more may be built by Spring.

INSTALL SUB-CYCLE IN THE MASTER RINGING CONVERTER

That MEETS Your Requirements

Provides Ample Power. Requires no Routine Maintenance. Cannot interfere with Radio Reception. Economical and Quiet in Operation. 6 Models for loads ranging from small PBX to the large central office. Output capacity 7½ watts to 40/50 watts.

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NOTHING TO ADJUST

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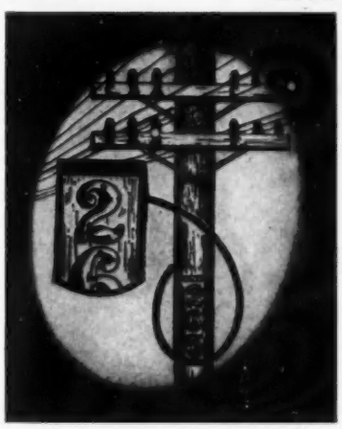

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Rural Station

INSPECTION

General

WHENEVER a rural station is visited by a trouble man for any cause whatsoever, it is generally a good practice to make a quick but thorough check of the entire station Installation. This will result in uncovering potential cases of trouble and in general will raise the service standard of rural phones if inspection and adjustment of a station is properly done. This is particularly true of stations located some distance in the country as the cost of coming back to these stations for a minor case of trouble is considerable and well worth avoiding.

A rural station insulation may be thought of as consisting of three essential units, namely, the subscribers set, the inside wire and the protector unit. The subset is the source of most station trouble, however, areas subjected to lightning storms, protectors are prone to create trouble. The inside wire, if properly placed will seldom be found at fault.

The Subscribers Instrument

IN testing and adjusting the subscribers instrument we should think of it as consisting of two separate circuits, one, the signalling circuit, the other the transmission or talking circuit. Trouble in the signalling circuit, may of course affect the transmission and trouble in the transmission circuit may likewise affect the signalling of a telephone.

Our inspection of the signalling circuit should involve first and examination of the generator to insure that it is securely bolted down, that it is properly oiled so that it will turn freely and that the shunt spring assembly is tight and properly adjusted so as to disconnect the generator from the line when the generator crank is released. Nothing is more annoying to the subscriber than a generator that cranks hard and sounds like a corn sheller when the crank is turned. Every tool kit should contain a can of light machine oil with a long spout so as to permit getting oil into the generator bearings. Care should be taken to avoid using too much oil as this might get in the contact and result in an imperfect electrical contact.

After the generator is oiled and with the line disconnected, it should turn quite freely, and with the terminals shorted, it should turn heavy indicating that it is able to deliver current to the short.

If an A.C. voltmeter is available it should be connected across the generator terminals and the crank turned briskly. The generator should develop from 65 to 90 volts depending on whether it is the three, four, or five bar type. A weak output often indicates weak magnets or in the case of a generator which has previously been worked on the possibility of a reversed magnet. Usually the bottom end of a magnet is marked with a punch mark and all marks should face the same side. In other words, all north poles should be on one side and south poles on the other of the armature.

Ringer Adjustment

THE ringer armature and ringer gongs must be properly adjusted if the bells are to sound loud and clear on incoming signals. Pivot screws should be adjusted and then locked in place so that the armature moves perfectly free without much side play. The gongs should be adjusted so that when the armature is operated the bell tapper strikes the gong but only due to the inertia and "give" in the bell tapper rod. That is, the tapper when held at the limit of its travel should clear the gong a fraction of an inch rather than rest against it. This is a very important point and failure to adjust the gong so that the clearance exists will result in the bell sounding dead rather than alive as they do with proper clearance. The bell is equipped with a bias spring and it should be adjusted so that only slight tension exists on the armature. The tension should be just sufficient to overcome bell tapping when the receiver is operated. Be sure that the wiring of the set which connects the ringer and generator to the line is in good condition.

If the telephone is the old type which carries the ringer connection across door hinges inspect these to insure that they are properly shunted so that they do not insert a resistance loss in the ringing circuit.

Amertel
. . . . for lower maintenance
The "True-Bonding" process, employed in coating all Amertel line wires with commercially pure zinc, guarantees a faultless bond between steel and zinc. This protection means longer life for the wire and less expense for maintenance of the line.
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The Talking Circuit

INSPECTION of the talking circuit of the instrument involves first listening to side tone with the line terminals shorted, careful examination of the hook switch to insure that it opens properly and that it completely disconnects the receiver from the line when the receiver is on the hook. It is seldom that the induction coil will be a source of trouble in the telephone except due to possible loose connections on its terminals, and poor transmission can generally be traced to defective transmitters or weak dry cells. The dry cells should be carefully tested to insure that they have not reached the "cut off" point. The cells should be tested with either a pocket type ammeter or preferably a volt meter and load resistance. Three dry cell sets should be thrown away when their voltage falls to less than 2.8 volts when they are discharging through 15 ohms. The old style 39 amp pocket ampmeter is not, generally speaking, a good method of testing dry cells as most telephone cells will show rather low short circuit current as compared to ignition cells and yet will give much longer service. However, it does give a rough indication of the energy left in the battery.

Telephones in Free China's Capital Go Underground

New York—When spring dispels the covering winter fogs and brings another "bombing season" to Free China's much-bombed wartime capital, Chungking's telephone service will go on as usual.

This fact is apparent in dramatic news, just received by United China Relief, that Chungking's entire telephone system has gone underground.

Subterranean wires and cables servicing 4, 120 lines that form the vital communication system inside Chungking and the Greater Chungking suburbs have been laid during the past, comparatively calm, winter months. All telephone exchanges in Chungking city have been established in bomb-proof shelters. Thus, even during the expected daily bombings of China's capital, which will start in late March or early May, the city will be able to maintain its normal telephone service. An important recent innovation is establishment of automatic telephones, which will release several hundred girls for war services.

Chungking, to date, is the only city in the world possessing subterranean exchanges and cables.

Construction of Chungking's chief downtown exchange was started in September 1940, less than a month after Chungking had undergone her first aerial blitzkreig, which laid waste a third of the city. Building of the main exchange was delayed by the difficulty of obtaining equipment, by air-raids, and above all by difficulties involved in blasting caves to accommodate the station out of the solid sandstone mountain on which Chungking sits.

The main downtown exchange, constructed at a cost of $350,000, is set up inside a series of tunnels that have been strengthened by reinforced concrete. This exchange, electrically lighted and electrically ventilated, houses 3,3000 trunk lines. Eight hundred and twenty lines in Chungking suburbs are linked to the central system by magnetic exchanges.

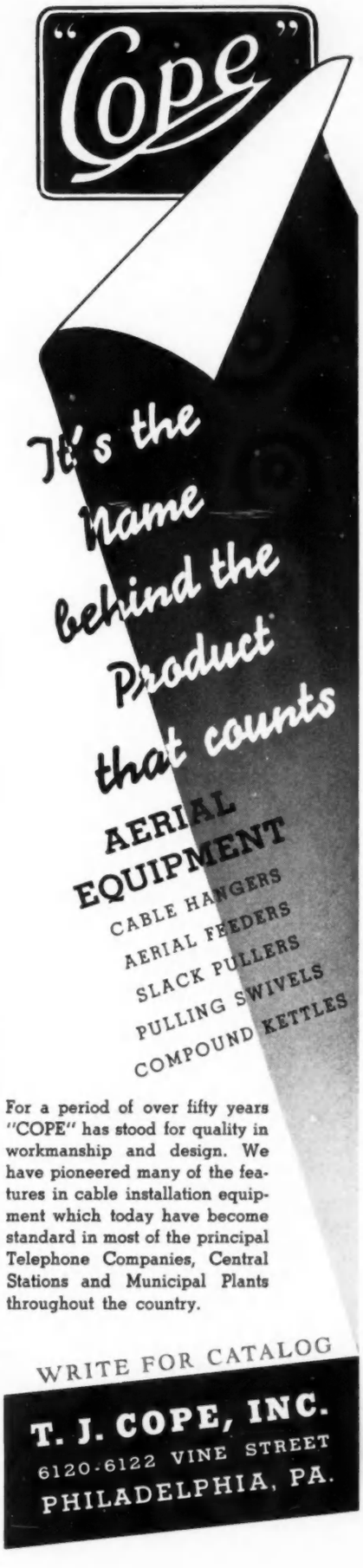
The heroism and audacity of several telephone officials, aided by equally courageous Chinese workmen, are responsible for the valuable telephone equipment installed in this central exchange, for the bulk of it was smuggled out of Nanking and Hankow after those cities were occupied by the Japanese.

When Nanking fell to the enemy in December 1937, Mr. Huang Ju-Tsu, Chief Engineer of the former capital's Telephone Administration remained in the city with about 50 telephone employees, at the risk of their lives to supervise the removal of telephone equipment. With the Japanese in full control of the city, the men managed to slip out and to escape with the equipment on river boats. Mr. Huang is today head of the Chungking Telephone Administration.

Other equipment was sent from America.

A serious transportation problem, finally solved by Chinese ingenuity, was involved in the cartage of this American equipment. When the American supplies finally arrived in Rangoon, it was discovered that each of the telephone cables, 600 meters in length and containing 600 pairs of wires, weighed several tons—an amount which could not be loaded in any single truck going over the narrow Burma Road. This problem was solved by cutting the cables into three sections, which were separately reeled before being loaded on the trucks. When the cables arrived in Chungking, the cut-off sections had to be soldered together and the 600 pairs of wires rejoined.

Chungking had it first telephones in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For a period of over fifty years "COPE" has stood for quality in workmanship and design. We have pioneered many of the features in cable installation equipment which today have become standard in most of the principal Telephone Companies, Central Stations and Municipal Plants throughout the country.
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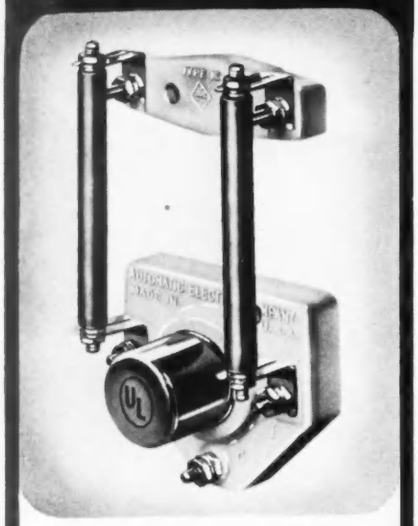
SANDS

SUBSTATION PROTECTOR



SANDS substation protectors have proved that they can withstand the hardest kind of service. Porcelain bases are of rugged, heavy construction for added strength—metal parts are also made and finished to pay dividends in extra years of service.

Protection to equipment is complete and continuous, due to the unique Type 2105 discharge block. This device not only grounds out dangerous potentials of all types, but also resets itself automatically after the current ceases to flow. It thus provides constant, unfailing protection—after as well as before a discharge takes place. In addition, it saves resetting and maintenance expense—a factor which has helped to promote the widespread use of SANDS protective products by a rapidly growing number of operating companies.

Distributors in U. S. and Possessions.
AMERICAN AUTOMATIC ELECTRIC SALES COMPANY
1033 West Van Buren Street, Chicago, U.S.A.

AUTOMATIC ELECTRIC

TELEPHONE, SIGNALING, AND COMMUNICATION APPARATUS

1915 when the city police department installed some magnetic telephones to connect its headquarters with the various city gates. Telephone communications in this formerly isolated city of China's "wild west" remained in a primitive state until 1931, when the municipal government took over management of the telephone exchange from private owners. The telephone administration went under the control of the National Ministry of Communications in August 1937, a month after the start of Japanese aggression.

Truck Rationing for Communications Industry

The communications industry was placed in the first "usage classification," along with military forces in the field and public health and safety services, in the rationing program for all types of new trucks announced this week by the WPB Division of Industry Operations. Under the rationing program, "vehicles principally (50% or more of their operations) used to construct and maintain mail, telegraph, telephone and organized radio communication services" are placed in the group to be rationed first by the authorities. The requirements of the communications industry should thus be filled even ahead of applicants, exclusive of Federal defense agencies, who want trucks for work in connection with fixed military and naval establishments, defense housing, and other public utilities, all of which were placed in the second classification.

Rationing of the new trucks—about 196,000 will be available in the next 22 months—will be carried out through application to the local allocation offices of the Office of Defense Transportation, which will consult with WPB in the program. These offices will also serve as field offices of the Bureau of Motor Carriers of the ICC. Applications will be available at truck sales agencies. If approved by the local ODT offices, they must be passed by ODT headquarters in Washington and WPB.

Illinois Association Defense Committee Issues Booklet

The Defense Committee of the Illinois Telephone Association, organized Jan. 7, was organized "to coordinate such matters pertaining to national defense as related to telephone companies in this state and to suggest methods of protection of property and facilities owned by such companies."

The Committee has prepared a statement of "Recommended Precautionary Practices for Protection of Telephone Plant." It is a booklet of 20 pages and outlines in detail the precautions necessary in event of attack. It is

the first of its type we have seen and from its contents feel Defense Committee of the Illinois Telephone Association is due congratulations.

In a letter enclosing the booklet to TELEPHONE ENGINEER, Mr. A. J. Parsons, secretary-treasurer of the Association concluded: "The Defense Committee is making a study of the practicability of the use of the uniform identification card and also plans to make further recommendations when necessary to coordinate the furnishing of telephone communications with the war effort."

R.E.A. Headquarters Moved To St. Louis, Mo.

REA is moving to St. Louis, Missouri, in accordance with the President's orders for decentralizing Government activities. This move will start on March 14; it will be completed about the first week of April.

Soon after April 1 the REA will be settled in the Boatman's Bank Building, at the corner of Locust Street and Broadway.

Blizzard at Pittsburgh Necessitates Phone "Emergency"

The Bell Telephone Co. of Pennsylvania was forced to request its Pittsburgh subscribers to stop using their telephones except for emergency calls March 3 when the worst blizzard in the city's recorded weather history, which goes back to 1884, struck the area. The Bell of Pa. broadcast an appeal over local stations, as 17 inches of snow fell, paralyzing transportation and slowing down the city's defense plants, as few workers arrived on time.

Nelson of WPB Addresses Conference of Publishers

America must face the fact that it can win the war only if it provides a greatly expanded production of military goods during the rest of 1942, Chairman Donald M. Nelson of the War Production Board told a conference of business paper editors and publishers this, during mid-February.

"Every weapon we make today is worth 10 that we might produce next year," Mr. Nelson said. "This year—1942—is the critical year in the existence of the United States. I'm not painting the picture darkly, but I do believe that we who know what American industry can do must look at the situation squarely and see what we can do to make up for lost time.

"We've lost a lot of time because industry was fearful of what might happen after the war if all our productive facilities were over-expanded. Let's stop thinking about what we'll do when it's all over and start thinking about what we're going to do now to prevent it from being all over for us.

"We've wasted the golden months in which we could have got fully ready—the months in which we could have expanded our steel industry, our chemical industry, our copper industry, and all the others, so that we would have plenty of everything. But we still have ten silver months—the months which remain in 1942—and in them we can still do things that we never thought possible. The speed, energy, will and determination which we put into those months will determine what we'll think when those months are gone."

"This country today faces the most gigantic job any country has faced in all history. We must build a great armament program: we must make up, in less than two years, what the aggressor nations have done in ten years; we must make **today** the things we would be making next year if we had the time to spare.

"Of course we face many problems, obstacles and difficulties. We can and will solve them, if we face the job coolly and deliberately and with determination."

Book Review

An excellent book titled "Troubles of Electrical Equipment" authored by H. E. Stafford has just been announced by the McGraw Hill Publishing Company of New York.

For telephone men who are called on to maintain charging generators, ringing machines, etc. this volume has much useful information. Typical chapters of real interest to telephone men are: Induction motor troubles and remedies, Maintenance of D.C. Generators, Insulation Resistance Tests, etc. This book may be ordered through Telephone Engineer if desired. Price $3.00.

Taxes Collected from Communications Service Rise

Taxes collected for communications services continued to show a sharp increase over the preceding year for the month of January, figures released by the Bureau of Internal Revenue reveal. Levies collected on telephone, telegraph, cable, and radiocommunications messages amounted to $5,619,128 for the month, compared with $2,391,411 for January, 1941. The local telephone service tax receipts, computed separately, were $4,280,926, a new high since the 6% levy went into effect.

Any Bonds Today?

J. T. Carliss, general manager of the Ohio Associated Telephone Company at Marion, Ohio, announces that 100% cooperation on the purchase of defense bonds has been obtained by that company's employees on the voluntary payroll deduction plan. The minimum deduction is $1 per week with no limit on top. 70 employees in the Marion district are affected. Who will be the next company to go 100%?

Keep poles straight . .
With
CHANCE
POLE KEYS
Field test show that Chance Pole Keys, which expand into solid earth, have approximately 50% greater efficiency than the old wood keys which rest entirely in tamped earth.
This new type pole key can be installed in approximate y fifteen minutes versus nearly three hours time required to install a wood key. The illustrations at right show the method of installation. Write for complete details.
A·B·CHANCE CO·
CENTRALIA MISSOURI

ROEBLING Drop Wire
puts the "S" in Telephone Service!
JR ROEBLING
Heavy overloading with ice, rubbing of tree limbs, the risks of inadequate sag and poorly made ties... any one of these can cause drop wire trouble, current backage and eventual replacement. No wonder this is the toughest of all the outside services.
That's why you want the toughest, most resistant wire available. And here's why you get it from Roebling. Better than 30% rubber insulation . . . two ply, closely woven cotton braid . . . thoroughly saturated with asphalt compound . . . coated with high-melting-point pitch . . . and finished with flake mica for easy handling.
Available in twisted pair or twin parallel. And you can pick whichever conductor you prefer . . . hard-drawn tinned copper, copperweld, iron or any one of 3 grades of bronze depending upon service requirements.
JOHN A. ROEBLING'S SONS COMPANY
TRENTON, NEW JERSEY
Branches and Warehouses in Principal Cities
MANY OTHER TYPES
of Roebling Telephone Wires and Cables are made in our mills under complete Roebling supervision and inspection—including Zinc-coated Line Wire, Interior Wire, Telephone and Switchboard Cable, Steel Suspension and Guy Strand. Wire Rope and Fittings.

The DILLON TEMPEROMETER

FOR MORE THAN SIX YEARS
HAS FAITHFULLY WITHSTOOD

The Acid Test

DILLON TEMPEROMETERS have been Standard Equipment with Construction and Maintenance departments of the largest Utility and Telephone Companies for more than six years. Also used by United States Government.

FIRST IN PEACE - FIRST IN DEFENSE!

A **perfect** cable splice every time when DILLON Temperometers register the temperature.

DILLON Temperometers are doing their part in building America's communication lines for national defense.

Calibrated from 150° to 1000° F. May also be purchased in Centigrade Calibration.

DILLON Temperometers are available for immediate delivery.

Many thousands in daily use.

HIGHEST QUALITY

No substitutions. Every instrument of finest construction.

ACCURATE

DILLON Temperometers are carefully calibrated for use with wiping solder, cable damming and impregnation waxes, compounds, etc. Speeds up job, eliminates guess work.

COMPACT SIZE

Only 9 inches long and weighs less than half a pound! Just right for the tool kit, and will stand up under tough abuse. Tells the **right** temperature at a glance.

$6.00
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5410 WEST HARRISON ST., CHICAGO, ILL.

Telephone Engineer HANDBOOK TABLES

By B. C. Burden

File—Pole Line
Date—March 15, 1942

Subject: Weight and Shipping Data for Northern White Cedar Poles.
(ASA Measurements)

General

The following table and several to follow gives the weight of poles of various lengths and classes, and the number required to fill a railroad car. This type of information is useful when ordering poles or when considering the number that can be carried on a truck or trailer.

Class	Length	Weight	No. for Carload
5	16	230	155
6	16	190	179
7	16	135	227
8	16	135	252
9	16	105	324
10	16	85	400
1	20	720	49
2	20	600	59
3	20	540	63
4	20	350	91
5	20	300	114
6	20	230	148
7	20	190	162
8	20	190	179
9	20	130	262
10	20	100	340
1	25	1020	34
2	25	780	42
3	25	600	54
4	25	515	63
5	25	420	81
6	25	300	114
7	25	250	124
8	25	250	136
9	25	200	170
10	25	150	227
1	30	1320	26
2	30	1170	30
3	30	870	40
4	30	630	54
5	30	520	63
6	30	420	81
7	30	350	88
8	30	350	98
9	30	275	124
1	35	1620	21
2	35	1380	25
3	35	1060	31
4	35	820	38
5	35	720	48
6	35	510	63
7	35	450	72
1	40	2040	17
2	40	1675	21
3	40	1280	27
4	40	1020	34
5	40	790	44
6	40	740	46
1	45	2640	26
2	45	1970	34
3	45	1535	45
4	45	1215	56
5	45	1080	63
1	50	3200	23
2	50	2640	26
3	50	1860	34
4	50	1470	47
5	50	1380	50

Asks Subscribers for Voluntary Rationing

Its switchboard and cable capacity overtaxed by increased calls due to the southern Indiana army camp, the United Telephone Company office at Franklin, Ind., recently sent letters to all private line subscribers asking permission to change to four-party-line service in Franklin.

Charles H. Jessup, district manager, announced that cooperation in the request would mean an 85-cent reduction on the monthly telephone bill.

"The voluntary rationing of telephone facilities will greatly assist us in best meeting the communication needs of Franklin," the letter said.

The firm recently placed an order with a manufacturer for a $75,000 switchboard, doubling the capacity of the local plant, but despite a high priority rating, officials expect several months to elapse before the equipment is completed and installed.

Commonwealth to Serve Wisconsin Ordnance Plant

Officials of the Commonwealth Telephone Company have announced an enlargement program for their Sauk City-Prairie du Sac, Wis., system to provide facilities to serve the $65,000,000 government ordnance plant being constructed in that area.

Approximately $50,000 will be spent as plans contemplate construction of an addition to the exchange building, replacement of central office equipment with a larger switchboard and associated apparatus, and installation of cable from the exchange to the ordnance plant.

During the construction telephone service is being supplied by the company which necessitates installation of a private branch exchange in the new administration building being built by the government.

New President at Elyria, O.

Arthur J. Robinson, president of the Elyria Savings & Trust Co., is the new president of the Elyria (O.) Telephone Company following the meeting of stockholders and directors on Feb. 17.

He succeeds A. J. Curran, resigned, who has headed the company as president for many years. Mr. Curran has a service record of 36 years with the company and saw it grow from a few hundred telephone stations to approximately 9,000 served at this time. He was president for 25 years. He will continue as a director.

Other officers elected are: Roy W. Ammel, vice president and general manager; Dan B. Symons, secretary-treasurer, and Mose Wilder, assistant secretary-treasurer. Directors re-elected were: Gustav Hirsch, Ammel, Robinson and Curren. New directors elected are: Messrs. Symons, Wilder and Leo. R. Meyer.

Exide Awarded Navy "E"

The Electric Storage Battery Company, Philadelphia, makers of Exide batteries has been awarded the Navy "E" pennant in recognition of outstanding performance in fulfilling Navy contracts, Secretary Knox announced March 11.

A swallow tailed pennant bearing the Navy fouled anchor and the Navy "E", symbol of excellence in the U. S. Navy since 1906, is the award. In addition each employee will receive a specially designed lapel button carrying a ship, the Navy anchor and eagle, the Navy "E" and the legend "For Production."

Radio Inspector Positions Open in Government Service

The position of radio inspector in the Federal Communications Commission has been added to those jobs in the field of radio for which the U. S. Civil Service Commission is seeking qualified persons. Salaries range from $2,000 to $2,600 a year. The maximum age is 45 years. Applicants for the written test on radio and electrical engineering must be filed with the Commission's Washington, D. C. office not later than April 21, 1942.

For assistant positions ($2,000 a year), completion of a 4-year college course in electrical or communication engineering or physics is prescribed. Provision is made for the substitution of radio engineering experience for this requirement.

Get Rid of Noise!
with the Improved
VINCENT RARE GAS RELAY

Installed in a Minute
No Moving Parts
Thousands in Service
Fully Guaranteed

Eliminates unbalance noises in metallic party lines employing divided ringing to ground. Works with either harmonic or code ringing.

Write for Catalog 39-A describing
Non-Grounding Rare Gas Arresters
Terminal Strips _ Potheads Housings

L. S. BRACH Mfg. Corp.
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Signal Circuit Engineers Since 1906

4 FREQUENCY MOTOR GENERATOR

This Machine **has no moving conductors.**
Requires neither brushes or collector rings.
Low cost maintenance.
Low current consumption.
Output 25 watts.
Can be furnished for A.C. or D.C. drive.
Can be equipped with tone, and machine ringing interrupters.

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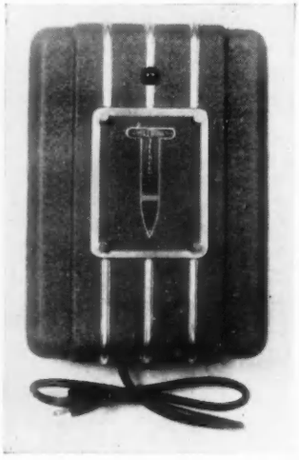
PRIORITY

While "all-out" National Defense co-operation is taxing our production facilities — We are proud we have been able to continue to make satisfactory deliveries to our government and to our customers in the telephone field.

TELERING

Reliable ringing service is essential in providing satisfactory telephone service.



Directly converts Commercial Alternating Current to Telephone Ringing Current—Current Consumption Negligible—Positively NO radio interference.

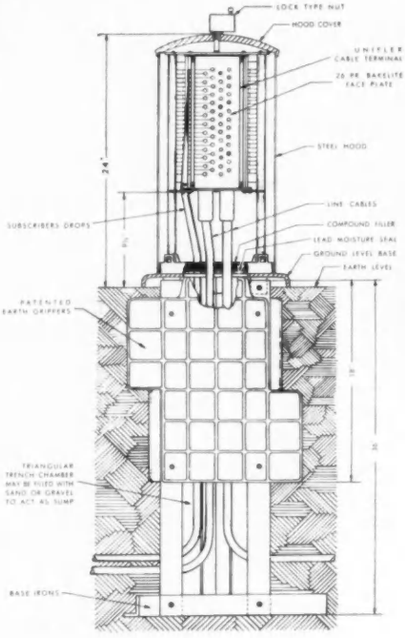
Use TELERING and provide the MOST reliable service at the LEAST cost.

Order through your jobber or direct from

TELKOR, Inc.
ELYRIA, OHIO

Terra-Term Underground Cable Terminal Announced by Cook

Terra-Term is the name of a new underground cable terminating and distributing terminal currently announced by Cook Electric Company as part of the new Cook new products program symbolized by the "New for '42" banner.



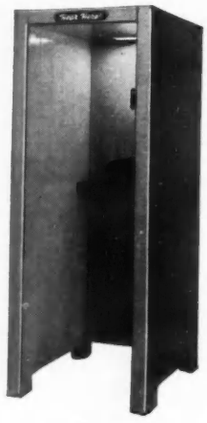
This new terminal, which employs a minimum of "critical" materials, provides terminal and distribution facilities for underground cables, either buried directly into the ground or carried in underground conduit, serving residential areas, police and fire alarm systems, railroad communication, defense and ordnance plant alarm systems, airports, firing ranges or air raid alarm systems.

The Terra-Term is built in two sections and when installed the 78 pair unit stands only 24" above the ground and 36" below the ground. It is set in a slight enlargement of the usual cable laying trench and its base construction using "earth gripper" side plates and broad angles prevents sinking or tipping without the use of concrete. The earth gripper plates form an underground cable chamber which is easily accessible.

Finished in airport yellow, weatherproof enamel over heavy galvanizing, the above-ground section contains Uniflex Cable Terminals in a floating mount. Sturdy protection against external impact and tampering is provided by a heavy welded steel shell, cast iron cap and tire type weatherproof lock.

The above-ground section is lead and compound sealed from the underground section, thus eliminating moisture and creepage. The capacity ranges from 26 to 156 pairs, or 78 pairs in and out.

New Burgess Booth



New Sound Proof Burgess Booth.

To conserve steel for national defense, the Burgess Battery Company, Acoustic Division, 530 W. Huron St. Chicago, has developed a new line of Acoustic-Booths, constructed of heavy reinforced birch plywood, specifically designed for industrial use. This new booth is available, without priorities, to all users, because no critical materials are used in its construction.

The walls and ceiling of this new booth consist of perforated, reinforced panels, which are filled with a thick blanket of sound absorbent material. The perforated acoustic panels blot up stray noise and create a remarkable "zone of quiet" in the booth. The combination of perforated heavy birch plywood and the sound-absorbent material which it protects, is a patented Burgess development.

Like other Burgess Acousti-Booths, the new Model 207 provides a quiet place for telephone users in factories, power houses, or other noisy industrial locations. Thus, errors due to confusion in 'phoned orders are eliminated. Burgess Acousti-Booth has no door because it needs none. Factory racket is absorbed so completely by the lining of the booth that telephone calls can be made in the noisest locations without interference.

The industrial Model 207 Burgess Accusti-Booth is finished in an attractive gray, or can be supplied unfinished. A shelf is provided for the telephone instrument and for taking notes. Overhead electric light fixtures with pull-chain provides ample illumination. Outside dimensions are 30 inches deep. Shipping weight is 225 lbs.

ATTENTION — ADVERTISERS
Our SPRING CONSTRUCTION NUMBER offers much opportunity for an excellent sales presentation.
(Read page 34)

Addressing the 1800 Kellogg employees attending the recent company mass meeting to promote further purchase of Defense Bonds, is E. R. Seese (center) of the U. S. Treasury Dept. At the left is L. H. Wilson, Personnel Manager of the company and at the right is Maurice K. McGrath Kellogg's President.

Kellogg Holds Defense Rally

The Kellogg Switchboard and Supply Company held a giant patriotic mass meeting of its 1800 employees to inaugurate a new drive to promote the further purchase of Defense Bonds.

Kellogg workers have already subscribed to approximately $60,000.00 worth of Defense Bonds through the Company during the past few months and they expect to send their Defense Bond sales soaring still higher.

A new plan, presented at the meeting by R. C. Krueger, Advertising Manager of the Company, consists of dividing all employees into 10 general Armies, with each being composed of one Army Division, one Navy Flotilla and one Air Squadron. Each employee will be a member of one of these combat units and the goals are represented by definite military objectives such as the Philippines, Tokyo, Berlin, etc. Two huge world maps have been installed in the Kellogg plant upon which progress is posted. As bonds are purchased, combat units will be advanced toward objectives.

Captains, Lieutenants, Majors and Commanders, have been appointed from among the employees to head the various units and will see to it that everyone in their command receives all necessary Defense Bond information. A semi-weekly bulletin, known as the "Kellogg Employees Defense Bond Messenger" keeps employees abreast of the program.

The principal speaker of the rally was Maurice K. McGrath, President of the Kellogg Switchboard and Supply Company.

J. H. Kellogg Secretary of the Company and a member of the Kellogg Defense Bond Sales Committee reported that almost $6650.00 has been subscribed for the purchase of 266 additional $25.00 Bonds by employees over the weekend.

Shows Products to Washington Officials

MORE than 50 Army, Navy, Coast Guard and War Production officials attended the "military meeting" and dinner March 6 at the Hotel Washington, given by the Cook Electric Company at which a highly interesting motion picture demonstration and exhibit of that company's protective apparatus and its usefulness were displayed. The meeting aroused the keen interest in the apparatus on the part of the Government officials.

The meeting was arranged by Kenneth Gillette, eastern division manager of Cook Electric, and other Cook Electric officials at the affair were Walter C. Hasselhorn, president, Chester Ruth, John F. Japp, and Sam E. Adair. Similar sessions have been held in Boston, Philadelphia, and Fort Monmouth.

Among the prominent persons at the Washington affair were Bruce McCurdy, chief of the WPB Communications Branch's Telephone Section; William Cook, its principal consultant; Carl D. Brorein, former USITA President and head of the Peninsular Telephone Co.; Clyde Bailey, USITA Washington Vice President; Lt. Col. F. L. Stanley and Major C. A. Kraege, former vice president of the McKrae, Kans., Telephone Co., both of the Signal Corps; Phil Greenwood, inspecting engineer of the Panama Canal; V. E. Gauthier, of U. S. Army Lend-Lease and Lt. S. F. Clark of the Coast Guard.

The purpose of these meetings, we understand, are to acquaint government officials, officers, engineers, etc. with technical details and applications of Cook Electric products and to have their opinions, criticisms and suggestions as to any improvements that could be made to enhance their value to the various government departments.

Pay Station Taxes

In the case of public pay stations where all the revenue is collected in the coin box, the 6% tax does not apply. On toll calls of 25c and over the toll tax applies and should be collected at the time money is deposited in the coin box in payment for the message.

In the case of pay stations (semi-public) where the company exacts a guarantee of a minimum charge, the 6% tax applies to the guarantee, and all moneys in excess thereof deposited in payments for messages of 24c and less, tax to be paid by guarantor. The tax on messages of 25c and over being collected by the deposit of coins in addition to the charge for the message.

The above clarification statement was issued to members of the United States Independent Telephone Association in the form of a bulletin issued March 6.

"LINE UP" with DICKE POLE LINE TOOLS

it's good to have Dicke Tools on your side. They are absolutely dependable. They'll last for years and help you keep overhead in its place. All crew men like them because they're easy to handle and help speed up work.

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McCanne Addresses FMBI

FM radio sets will be available beyond April 22nd, and may be obtained by the public even after Labor Day, it was revealed by Lee McCanne in a talk on FM receiver production prospects for 1942 before the general meeting of the FMBI in New York on March 3rd.

Mr. McCanne estimated, on the basis of reports from leading manufacturers of radios, that fully one-third and possibly more than one-half as many FM sets would be made available in 1942 as were put in operation in 1941.

In explaining the Labor Day availability, Mr. McCanne said that the WPB order L-44 cancelling work on chassis put into production on April 23rd would be observed to the letter by the industry.

Mr. McCanne asserted that Stromberg-Carlson, who delivered 10% of all the FM sets sold by the industry up to the end of 1941, will produce even more FM receivers in 1942 than they did in 1941. His company stopped production of non-FM sets immediately on receipt of order L-44, and has put only AM-FM units into production since January 23rd.

Rebuilt Electric Moves to New Building

The Rebuilt Electric Equipment Company is announcing in this issue a new address. Effective immediately they will be handling their business from their own building at 1704 W. 21st Place in Chicago. They want all of their customers to know that their orders will be handled just as carefully during this "settling" process as always.

New Bulletin Issued by W. N. Matthews Corp.

A new bulletin No. 301 has been issued by W. N. Matthews Corp., St. Louis, Mo., showing their products for the telephone, communications and public utilities field.

Complete descriptions are given on many of the products used in the telephone field and manufactured by Matthews. Included are slack pullers, guy anchors, connectors, teleheights, guy guards, wire clips, telefaults wire reels and splicing joints. A copy may be had by writing the company at the above address and mentioning TELEPHONE ENGINEER.

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Write or telephone for proposition
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Specialists in Repairing and Rebuilding Transmitters

Repair service for Transmitters, Receivers, Desk Stands and Wall Phones—Magneto or Common Battery.

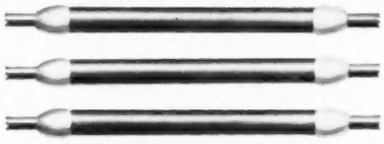
WE BUY
WE TRADE
WE REBUILD

Old telephones or parts into smart modern-looking wall phones or desk sets with new cabinets.

Telephone Repair Co.
Daniel H. McNulty, Manager
Rogers Park Station Chicago

LOOK!

Those joints are perfect



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3035 Aldrich Avenue Minneapolis, Minn.

RECONDITIONED WESTERN ELECTRIC TELEPHONES

No. 1533 WALL PHONES
No. 1020-AL DESK STANDS
with
No. 534 BELL BOXES

(Rebuilt and refinished)

Write for prices.

Buckeye Telephone & Supply Company
COLUMBUS, OHIO

Gus Ruhling

Gus Ruhling

On February 15, Gus Ruhling, well-known manufacturer's representative, passed away at his home in Chicago, after a lingering illness. Mr. Ruhling started the company that bears his name 35 years ago, devoting his attention exclusively to the electrical and hardware field. Up until the time of his death he represented Mathias Klein & Sons. The business he founded will be continued under the same name by his son, Herb T. Ruhling.

Exide Report

The Electric Storage Battery Co. and subsidiaries, with general offices in Philadelphia, report for the year ended December 31, 1941, consolidated net income of $3,312,413 after provision for fluctuation in inventory values, loss on foreign exchange and $3,126,875 provision for state and federal income and excess profits taxes and estimated foreign income taxes. This is equal to $3.64 a share on 907,810 shares of capital stock in the hands of the public. In year ended December 31, 1940, net income amounted to $2,167.592, equal to $2.38 a share on the same number of shares then outstanding.

Sales continued to increase during 1941, totaling $47,553,169 compared with $33,151,906 in 1940 and $28,408,743 in 1939.

Buy Defense Bonds

A NEW, IMPROVED— UNIQUE SPLICERS FURNACE

Melts 50 Lbs. of Solder in 10 Minutes

Basically the same fine furnace used by larger Utilities for 20 years - Now with

- **FINE FLAME CONTROL**—keeps solder at "just the right temperature."
- **"QUICK CHANGE" GENERATOR**—removed and replaced in 60 seconds.
- **WIND-PROOF**—housing shields generator—No extra shield is needed.

Additional Features: Long-life figure "8" generator—with orifice scraper. Rugged semi-steel top plate. Powerful pump. 16 gauge welded steel tank with bottom shock ring. Size 8" x 13". Weight—15 lbs. Popular size for 6", 7", and 8" pots.

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If clear white gasoline is hard to get, order the Kerosene Furnace. You'll like it.

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231 W. Walton St. — Chicago, Ill.

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Your Subscribers Rental & Toll Ledger, Records and Books, or Toll Tickets, Trouble Tickets, Work Orders, Etc.

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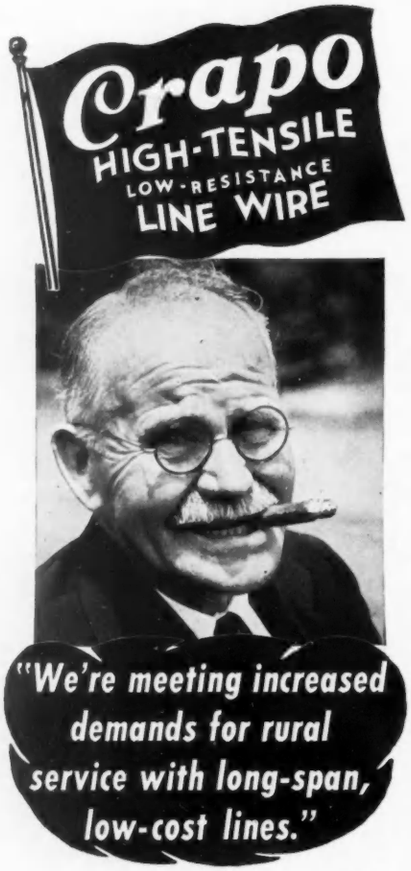
TELEPHONE PRINT COMPANY
123 W. Washington St. Napoleon, Ohio
Quality Work Only. Send for Catalog.

Classified Advertising

HELP WANTED—Central office equipment engineer familiar with automatic, common battery and magneto equipment of all types. Capable of engineering central office conversions, maintenance, and rehabilitation programs. Must be a man of wide experience. Telephone Services, Inc., Lincoln Tower, Ft. Wayne, Indiana.

FOR SALE

Used manhole frame with cover-base 50"x44"; 12" high; 24" round cover. $16.00. Ray Palmer, Merrifield, Minnesota.



LONG-SPAN construction, made possible by *Crapo* High-Tensile Line Wire, is enabling telephone companies everywhere to extend their lines economically and profitably. Reports of typical installations tell of substantial reductions in construction costs, of savings in time and material and of improved operation. Decreased maintenance expense, too, is the rule wherever this wire is in service.

● *Crapo* HTL-85 permits spans of 225 feet in Heavy to 375 feet in Light Loading Districts; provides stronger, safer spans when used for replacement on existing lines. *Crapo* HTL-135, with two and one-half times the tensile strength of standard B.B. wire, makes possible spans of 350 feet in Heavy to 500 feet in Light Loading areas. Both wires possess telephonic transmission qualities superior to the B.B. grade.

● Complete technical data and valuable construction practice information is available for the asking. Write today for Bulletins No. 201 and No. 202!

Produced by the Manufacturers of *Crapo* Galvanized Steel Strand, Telephone and Telegraph Wire, Construction Wire, Tie Wire Ground Wire.

INDIANA STEEL & WIRE CO.
MUNCIE, INDIANA

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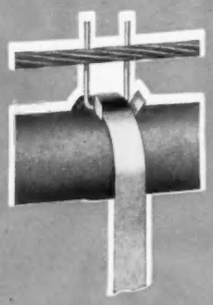
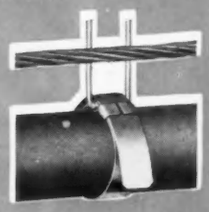
Hang them with . . .

NATIONAL SUPPORTS

ADJUST-A-STRAPS



SPLIT CLASP OPEN



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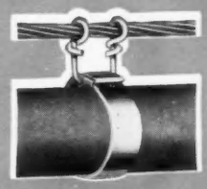


COMPLETED INSTALLATION

National Adjust-A-Straps are designed for use where the cable is hung with rings and it is desirable to replace two or more rings on either side of the poles.

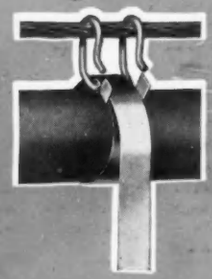
With the use of Adjust-A-Straps all danger of fatigue break is eliminated because they allow full hinge motion as cable contracts, expands and vibrates. And because Adjust-A-Straps follow the standard practice of suspending the cable away from the messenger all chance of cable wear that threatens when the cable is in contact with the strand is removed.

Adjust-A-Straps may be quickly and easily installed. The novel split clasp feature at the top of the strap completely eliminates the "fussiness" of feeding the strap through a solid buckle, and allows the strap to be wrapped tightly about the cable and then locked firmly in position.

Adjustable supports permit the cable being properly lined up with adjacent rings.

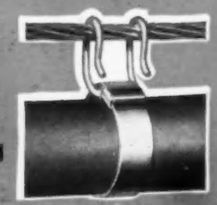
Adjust-A-Straps are made in nine stock sizes for various cable diameters.

Zinc-Wraps



SPLIT CLASP OPEN

SPLIT CLASP CLOSED



COMPLETED INSTALLATION

Here is an up-to-the-minute method of supporting the entire cable span.

Zinc-Wraps have many advantageous features that make their use most desirable.

They may be quickly and easily installed. They eliminate any damage to the cable. They are designed to allow a full hinge motion on the clip, thus eliminating the danger of fatigue break.

Following the standard practice of suspending the cable away from the messenger they eliminate the wear that threatens when cable is in contact with the messenger.

They have the same advantageous feature of the unique split clasp as the Adjust-A-Strap.

Zinc-Wraps hug the cable tightly and are strong.

Zinc-Wraps are made in five stock sizes, to fit cables of various outside diameters and the universal hook fits $\frac{5}{16}$", $\frac{3}{8}$" or $\frac{7}{16}$" strand.

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Export Distributor—INTERNATIONAL STANDARD ELECTRIC CORP., NEW YORK, N. Y.

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"All-Relay's" freedom from maintenance releases manpower for other vital purposes.

THE NORTH ELECTRIC MFG. COMPANY
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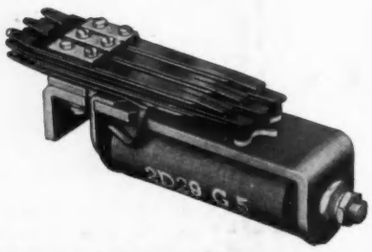

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